

SOYBFANS IN KANSAS

by

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## INTRODUCTION

### Purpose

Soybeans as a cash crop, have rapidly increased in importance in Kansas agriculture and have reached major proportions as a crop on farms in the eastern section of the state. The increase in production has been dramatic since the outbreak of World War II. The soybean is well adapted to conditions in eastern Kansas, being utilized principally as a grain crop and to a limited extent as a hay crop.

It was the purpose of this study to analyze the production, marketing, and processing of soybeans in the state of Kansas,

Trends in soybean production have been analyzed and a study made of factors which have been responsible for the rapid expansion, as well as factors which tend to hold in check the further expansion of soybean production. An analysis was also made of the trend and seasonal movement of prices received by farmers for soybeans in the state of Kansas and the United States. In conjunction with the study of price movements of soybeans and soybean products a study was made of a few of the many price and factor relationships that existed between soybeans and soybean products, and their competing products.

The inevitable development of the soybean processing industry in Kansas in the wake of the rapid expansion of soybean production demanded attention. The extent of existing processing facilities along with the procedure followed by the industry in obtaining their raw materials and disposing of their finished products were examined.

Theae data analyzad are applicabla for the period of 1925 to 1950 inclusive. The study was made in 1952.

#### Raview of Litaratura

Litaratura apacifically pertaining to tha production of soybaans in Kansas was limited. Extansiva uso was mada of the annual Reporta of the Kansas Stata Board of Agricultura published by tha Stata Board of Agricultura.

Tha most useful literatura and information on past and currant pricea was found in the various monthly and bimonthly publications of tha United States Department of Agricultura and Reporta of tha Kansas Stata Board of Agricultura. Agricultural Statisticia, Tha Faed Situation, The Fats and Oils Situation and Crops and Markets were the basic sources of prica data.

A taxt book co-authored by V. C. Piper and W. J. Moraas, entitlad Tha Soybaan, and a publication by tha United States Deportment of Agricultura, Soybeans in American Farming adited by E. G. Strand provided general background and information on soybeans aincia their firat introduction into America.

To gain o perspactive view of the soybean and soybean products price astructure, the publication by Dr. G. L. Jordan of tha University of Illinois, Agricultural Experiment Station entitlid What Determines Soybaan Pricea was axtramente halpful aa were the varioua other Stata Agricultural Expariment Station publications.

Dr. Jordan analyzad the effact of a change in diposable peraonal income on a composita of edible fata and oils which includad soybaan

oil, cottonseed oil, lard and butterfat. He found that for a 1 percent rise in disposable personal income there was a corresponding 1.01 percent rise in the price of the composite edible fats and oils.

He also found that for a 1 percent increase in supplies of edible fats and oils there was a 1.44 percent decline in the composite price of edible fats and oils.

In investigating the prices determinants of soybean meal he concluded that a 1 percent rise in disposable personal income resulted in a 1.2 percent rise in the price of a composite of protein supplements,<sup>1</sup> and that an increase of one bushel of corn per animal unit was associated with a decline in prices of protein supplements of approximately 2.5 percent. It was also found that a 1 percent increase in the supply of protein supplements resulted in a .43 percent decline in the prices of protein supplements. These three factors used by Dr. Jordan (disposable personal income, corn supply per animal unit and the supply of protein supplements) accounted for more than 97 percent of the year to year variations of the composite price of protein supplements. The data analyzed by Jordan were for the period 1930 to 1948, excluding the war years.

As a further guide in the study of soybean and soybean product prices a publication by Professor Don Paarlberg of Purdue University Agricultural Experiment Station entitled Prices of Soybeans and Soybean

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<sup>1</sup>These included soybean meal, cottonseed meal, linseed meal, copra meal, peanut meal, gluten feed and meal, tankage, meat scrapes and fish meal.

Products was very helpful. Professor Pearlberg realized that the soybean industry was still not in a state of equilibrium and advised people to interpret the findings of his report with caution. He analyzed the trend of soybean prices and the seasonal movement of soybean and soybean product prices on the national level. Professor Pearlberg stated that the most important price influences were as follows: the price level, some measure of supply, and the price of a competing product. He concluded, though, that the supply was far less important than the other two factors.

As a guide to the analysis of the seasonal movement of soybean and soybean product prices a publication by the University of Minnesota entitled Seasonal Variations of Prices and Marketings of Minnesota Agricultural Products, 1921-1933, edited by Warren C. Weite and Rex W. Cox proved very helpful. This publication was used principally as a guide for table presentation.

In an attempt to obtain literature on soybean processing in Kansas the only publication which afforded information, in addition to data mentioned earlier, on the still very young Kansas industry was the Kansas Official Directory, published by the Kansas Grain, Feed and Seed Dealers Association. This directory gave the locations, sizes of the plants and the names of their managers.

#### Method of Procedure

In order to eliminate the effects of a rising price level, the prices were deflated using the United States Bureau of Labor Statistics wholesale price index. Since it was found that approximately 11 counties had in the past produced approximately 75 percent of all the

soybeans produced in Kansas, it was decided to correepond with the county agricultural agente concerned and to visit with them whenever possible. Through theee media it was possible to obtain valuable information relevant to the production of soybeans.

Price data for soybeans were compiled for the United States and Kansas for the years 1925 to 1950. The use of graphic correlation and the Bravais-Pearson coefficient method of correlation analysis<sup>1</sup> were used in order to eetablish the relationships that existed between various dependent and independent variables.

Six methods of establiehing seasonal variations were available, namely, the monthly average of unadjusted data, the monthly percentage of the annual average, the percentage of trend, the percentage of a centered twelve-month moving average, the link relative method, and the graphic approach. The centered twelve-month moving average method wes chosen because it tended tc remove the periodic movemente since the moving average had the same number of months as the periodic movemente that wero sought to be eliminated.

In computing the seaeonal index of variation of soybean and soybean product prices e modified short cut method was used.<sup>2</sup> The traditional short cut method<sup>3</sup> of computing a seasonal price index

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<sup>1</sup>Richardson, C. K. Statistical Analysie, New York: Harcourt Brace and Company, 1944 p. 238.

<sup>2</sup>This method was used at the suggestion of Dr. L. W. Schruben, Professor of Agricultural Economics, Kansas State College.

<sup>3</sup>Croxtion, F. W. and Cowden, D. J. Applied General Statistice. New York: Prentice Hall Incorporated, 1947. p. 475.

involved four separate steps which were: (1) computing a twelve-month total, (2) a twenty-four month total, (3) a centered twelve-month moving average and (4) a percent of the centered twelve-month moving average.

The modified method required a different arrangement of data presentation from that required by the traditional method. Under the traditional method one data sheet contained the columns for the four operational steps, while the short cut method required a data sheet for each step. Each data sheet was characterized by a stub which contained the years and the caption which contained the months.

The principal advantages of the modified twelve-month moving average was that a considerable amount of time was saved, since the first step was the computation of the twenty-four month total. The computation of the twelve-month total was dispensed with.

The calculation of the seasonal price index for soybeans in Kansas and the United States, for soybean meal and soybean oil involved the use of tables. Since these tables were considered valuable to the thesis but too numerous to be placed in the descriptive matter, they were placed in an appendix.

Not only was the index for the average seasonal price movement important, but also the extent to which the individual years conformed to the average seasonal price movement. As a measure of this conformity an index of irregularity was computed for each month. This index of irregularity is the average deviation of the percentages of trend for particular months about the value of the index of average seasonal variation for that month.

In order to obtain information regarding the soybean processing industry in Kansas it was necessary to visit the respective managers, visit their mills and learn from them the operations associated with the functioning of a soybean mill. The managers were contacted by mail and their assistance was solicited. They were notified of the purpose of this study and what information was being sought. The cooperation obtained was gratifying and extreme interest was shown by them, in the study.

To facilitate orderly compiling of information, a schedule was drawn up to serve as a guide. Approximately one half day proved to be ample time for obtaining the required information.

#### Historical Background<sup>1</sup>

The volume of soybean production in the United States has increased rapidly since the first introduction of the soybean in the early part of the nineteenth century. Pennsylvania, in 1804, became the first state to have successfully grown the soybean plant. It was not until the latter part of the nineteenth century that the United States Department of Agriculture began to introduce a great many varieties, and to experiment, in cooperation with several State Agricultural Experiment Stations, on a program of selection and breeding.

From 1900 to 1923 the soybeans planted in the United States were used principally as a forage crop and as a source of seed.

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<sup>1</sup>Based largely upon Strand, E. G. Soybeans in American Farming: United States Department of Agriculture, Technical Bulletin 1966. Washington: Government Printing Office, Nov. 1948.

In 1922 the first sizable soybean processing plant was put into operation in this country, which proved to be an indication of what the future held for the soybean in the United States.

In 1924 the United States produced five million bushels of soybeans as compared to the total world production of two hundred million bushels. By 1934 the volume of production in the United States had increased to approximately twenty-three million bushels. The growth of soybean production was exceedingly rapid from 1934 to 1939 at which time approximately one hundred million bushels were produced. During World War II the production of soybeans in the United States continued to increase as it did during the post war period. Today the production is about two hundred and eighty million bushels, which is approximately one half the world production.<sup>1</sup>

Soybeans were first introduced into Kansas in 1889, at which time the Kansas State Agricultural Experiment Station at Manhattan, Kansas, began experimental work with soybeans. They remained in the background of importance to Kansas agriculture until the 1930's, being grown principally as a forage crop. In the 1930's the programs of the Agricultural Adjustment Administration contributed to their expansion. Restrictions on the acreage of corn made more land available for other crops. Payments were made to farmers for keeping part of their cropland in crops classified as soil-conserving. Although this program did not affect Kansas to the same degree it affected the Corn Belt states, it did provide wider knowledge of the possibilities and potentialities of the soybean.

### Limitations

Inasmuch as the soybean industry in Kansas is still comparatively new, and as yet, has not achieved any great degree of stability it would be only right to exercise some caution in drawing conclusions regarding the potentialities of soybeans in Kansas agriculture.

The limitation to the reliability of the use of historical price data as basis for the prediction of the prices in the future must be recognized. The prices farmers receive for soybeans are affected by a host of variable factors. It appears that an accurate prediction of the future price can only be made if we can fully account for, and measure the effect of those factors on soybean prices. Also, when we have reason to believe that the future relationships will not change from those that had existed in the past.

When the index of average seasonal variation of prices received by the farmers for soybeans in the United States and Kansas was computed for the period of 1925 to 1950, one limitation was recognized. It was that price data for the early period included a high proportion of the soybean sales for seed.<sup>1</sup> With the recent large production of soybeans the seed used has made up only a small part of the total crop, and published prices reflected mainly commercial uses.

The projection of past price movements into the future is no assurance that the future will conform to the past, but a historical record of past relationships is an indispensable guide for the future.

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<sup>1</sup>Strand, op.cit. p. 11

## THE TREND OF SOYBEAN PRODUCTION IN KANSAS

The soybean which was introduced into Kansas in 1899, remained in the background, and had received a limited amount of attention from the Kansas farmers as a potential cash crop. However, immediately after the outbreak of World War II the soybean became an important crop to the farmers of eastern Kansas.

Before 1930 no definite trend of production was evident as shown by Fig. 1 and Table 1, but after 1939 a definite upward trend in production of soybeans appeared. In 1939, Kansas produced 64,000 bushels while five years later, in 1944, the production rose to 3,315,000 bushels and then in 1950 the production increased to 6,462,000 bushels. Another factor which had played an important role in furthering the increase in production was the significant increase in yields per acre as shown by Table 1. This projected trend indicated further expansion, the limits of which in the opinion of some of the county agricultural agents have not been yet reached.

Kansas has been a wheat producing state and undoubtedly will continue to be such under the present existing conditions. The eastern one third of the state, where the soybeans have been exclusively produced provided room for further expansion but limitations do exist. It was found that in the past, eleven counties in eastern Kansas produced 75 percent of the annual total Kansas soybean production. That was approximately 25 percent of the soybean producing counties in Kansas.

In order to learn of the extent to which soybean production

had affected tha leading soybean producing counties, correspondence with the respactive county agricultural agents was resorted to. According to the county agricultural agents the production of soybeans has reducad the acreages of corn, oats, sorghums, flax and some permanent pastures and meadows. Inasmuch as the production of soybaans had displacad the production of other crops it was asaumed that the prica relationships which existed between the soyboans and tha displaced crops tended to direct tho volume of production of soybeans. To varify this assumption a correlation analysis was carried out to verify the existence of such a relationship. The results of this analysis are presented in a latar saction of the theais.

Furthermore, it was learned from the county agricultural agents that a very important factor affecting soybaan production in Kansas was weather conditions at the time when other crops were to be planted. For example, a very cold wet or a very dry early spring would prevent the seeding of a crop requiring early seeding.

Through tha correspondanca carried on with tho county agents it was also learned that the production of soybeans did not enter into any definite crop rotation. Some of the producers did attempt to use the soybean in a short rotation with wheat, sweet clover and corn, however, it usually was the case that the existing weathor conditions played tha important role and the farmar gave up thinking in tarms of a rotation.

Table 1. Annual Production, Yield and Price of Soybeans in Kansas,  
1925-1950.

Year	Production	Yield	Price	Deflated Price <sup>1</sup>
:	:	:	:	per bus.
:	bus.	bus. per acre	per bus.	per bus.
1925	89,566	10.6	2.34	2.25
1926	79,451	11.9	2.01	2.01
1927	64,098	10.2	1.81	1.90
1928	81,238	9.4	1.88	1.94
1929	89,908	8.9	1.88	1.98
1930	174,073	9.3	1.36	1.58
1931	270,710	8.0	.49	.67
1932	195,285	8.9	.54	.83
1933	219,046	9.3	.93	1.41
1934	78,435	4.0	.99	1.32
1935	65,000	3.4	.73	.91
1936	24,000	1.6	1.28	1.49
1937	32,000	8.0	.84	.97
1938	63,000	10.5	.68	.86
1939	64,000	8.0	.81	1.05
1940	311,940	13.0	.90	1.14
1941	564,000	12.0	1.55	1.78
1942	2,514,000	12.0	1.61	1.63
1943	2,318,000	9.5	1.81	1.76
1944	3,315,000	15.0	2.05	1.97
1945	2,350,000	10.0	2.08	1.96
1946	2,178,000	11.0	2.57	2.12
1947	1,887,000	8.5	3.34	2.20
1948	2,505,000	15.0	2.27	1.38
1949	3,436,000	14.5	2.16	1.39
1950	6,462,000	18.0	2.45	1.51

<sup>1</sup>Price was deflated by the use of the United States Bureau of Labor Statistics wholesale price index.

Source: Compiled from data published annually by the Kansas State Board of Agriculture.

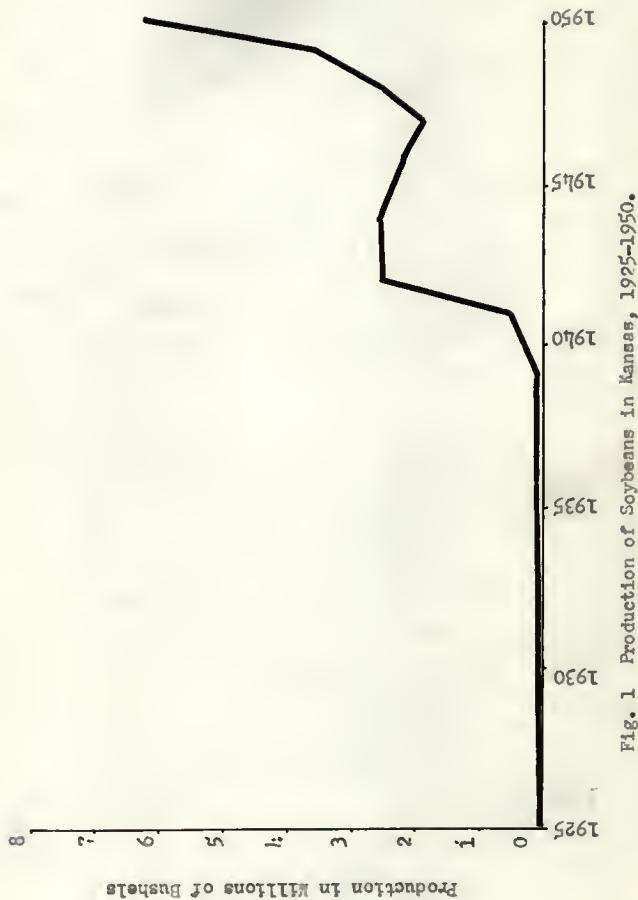


Fig. 1 Production of Soybeans in Kansas, 1925-1950.

### THE TREND OF SOYBEAN PRICES RECEIVED BY KANSAS FARMERS

The general trend of prices received by farmers for soybeans in Kansas followed closely the level of economic activity as shown by Fig. 2, which was constructed using deflated prices. In the 1920's the price was high, then declined from 1929 to 1931.

From 1933 to 1936 there was a price recovery, however, in 1937 when the national economy suffered a slight recession the price dropped again. With the outbreak of World War II the prices of soybeans suddenly became considerably higher. Since the end of the war the price of soybeans has remained at a relatively high level. This may be partly due to a high domestic demand for edible fats and oils, the increase in the livestock population and the advancement that research has, and is making in finding new uses for the products of soybeans. Another group of factors considered to have contributed towards the maintenance of relatively high prices was the shortage of fats and oils in Europe immediately after World War II, and United States' committal to supply its former allies and enemies with the fats and oils.

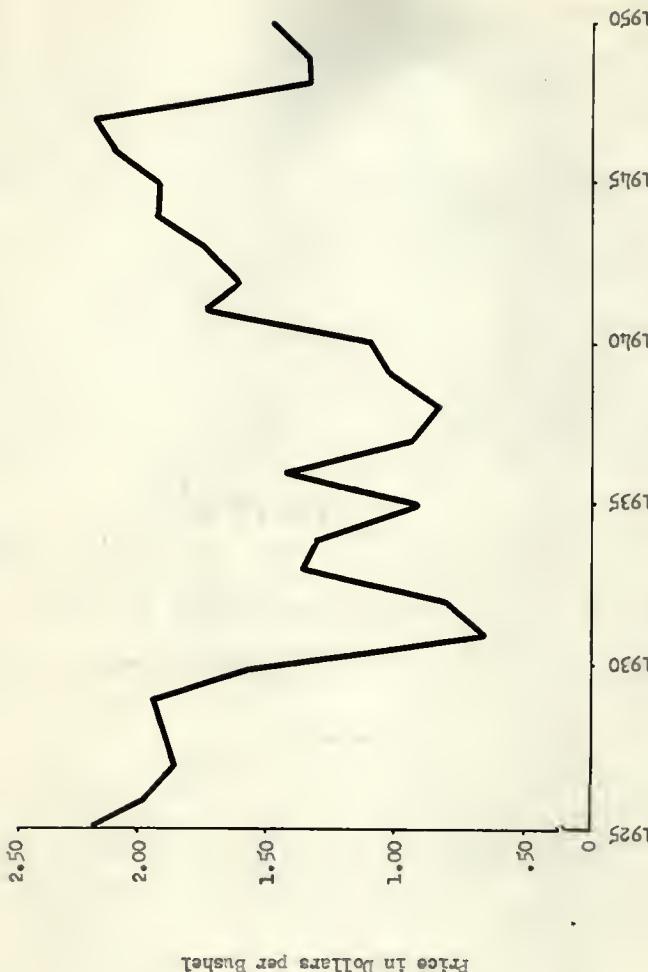


FIG. 2 Average annual deflated price received by farmers for soybeans in Kansas, 1925-1950.

THE RELATIONSHIP BETWEEN THE CORN-SOYBEAN PRICE RATIO AND THE  
SOYBEAN ACREAGE THE FOLLOWING YEAR

In The United States

The period of time that was studied extended from 1929 - 1950. It was assumed that corn actively competed with soybeans for the land; an assumption which seemed not too unrealistic. Many agricultural apocialists today consider that any further increasea in soybean acraage can only come at the expanse of the corn acreage.

The psriod from the time the soybeans were introduced into this country up to, and including 1933, was considered non-comparable with the period after 1933, at laast not comparable for the establishment of the relationship mentioned. The soybean production in thse early years was relatively unimportant, the acreage planted was small and the yiolda were light. After 1933, when conservation came to the fore and soil building programs were initiated, soybeans began to activoly compete with corn for the factors of production.

As a result, the data for the years before and including 1933 were not used in establishing the relationship between the corn-soybean price ratio end the area aeeded to soybeans the following year.

Fig. 3, which uses the corn-soybean price ratio as one of the variables and the aeras in soybeana for the other variable, by inspection, indicated that a definite ralationship existed between tho two variables when the years before 1934 were not allowed to influence the results.

The coefficient of correlation between these two variables was -.80. With 14 degrees of freedom, this coefficient is highly significant. A coefficient of correlation of -.62 is significant at the one percent level. This indicated a high degree of relationship between the corn-soybean price ratio and the acres planted in soybeans the following year. Expressing this coefficient of correlation as a coefficient of determination, the statement can be made that 64 percent of the variation of the acres planted in soybeans was accounted for by the variation in the corn-soybean price ratio.

This highly significant correlation between the corn-soybean price ratio and the acres planted in soybeans the following year has added a degree of confirmation to the prevalent belief that corn does compete with soybeans for the land resources in the United States.

Another outcome of this significant correlation was that it could be assumed that it had taken the farmer in the Corn Belt, (which accounts for 90 percent of the total U.S. production), just one year to adjust his level of production of soybeans to a level compatible with the previous year's corn-soybean price ratio.

#### In Kansas

Since it was found that such a high degree of correlation existed between the corn-soybean price ratio and the acreage of soybeans planted the following year in the United States, the degree of a like relationship as it existed in Kansas was investigated.

It was not until the 1940's that Kansas farmers devoted large

acreage to soybean production, therefore the period prior to 1940's was not entered in the analysis. Having used such a short period for the analysis, a serious limitation was imposed on the reliability of the results. However, it was reasoned that if any significant relationship existed, the scatter diagram and the correlation analysis process would reveal this relationship.

When the coefficient of correlation between the two variables was determined it was found to be -.31. With eight years under consideration the reliability of any correlation would be poor, and, when combined with a low correlation the results are indeed insignificant.

The condition that had existed in the United States as a whole, corn and soybeans competing for the use of the land resources, was not reflected in Kansas. However, the results of the correlation in Kansas had to be reconciled with the statements made by the county agents that soybean acreages had displaced corn acreages. It was reasoned that the competition between the two crops did exist in the high producing counties, but when the whole of Kansas was considered, statistical evidence of such a condition was not obtained.

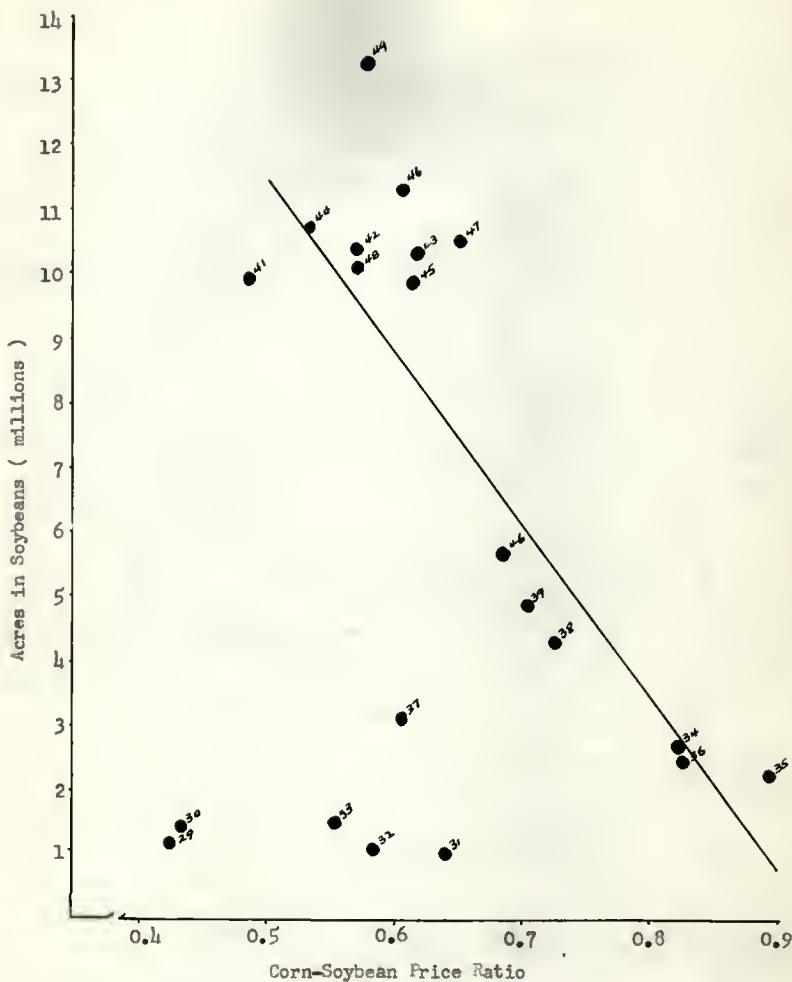


Fig. 3. Relationship between corn-soybean price ratio and the soybean acreage the following year in the United States, 1934-1950.

## THE RELATIONSHIP BETWEEN SOYBEAN PRICES IN THE UNITED STATES AND KANSAS

The average monthly prices received by farmers for soybeans in the United States and in Kansas for the years 1925 to 1950 inclusive, were graphically correlated, Figs. 4 to 15.

Figures 9 to 20 indicated that the prices farmers received for soybeans in Kansas bore a very close relationship at all times to the prices received by farmers for soybeans in the United States.

The relationship between the two price series appeared to be linear with a high positive coefficient of correlation. In order to test this assumption the coefficient of correlation was calculated for the months of June and October. The coefficient of correlation for June was .94 indicating a very close relationship between the two price series. Expressing the coefficient of correlation as a coefficient of determination, it can be stated that approximately 88 percent of the monthly Kansas soybean price variations are related to the variations of the price received by farmers for soybeans in the United States.

The coefficient of correlation for the month of October was .95; the two price series showed a high degree of conformity to one another and obvious regularity of movement. With a coefficient of correlation of .95 the statement can be made that approximately 90 percent of the Kansas soybean price variations are related to the soybean price variations in the United States.

The coefficients of correlation for two months were calculated, and these were for June and October, the seasonal high and the seasonal low. By the inspection of Figs. 4 to 15 it was quite apparent that the

coefficients of correlation for the other ten months were equally as high as they were for June and October.

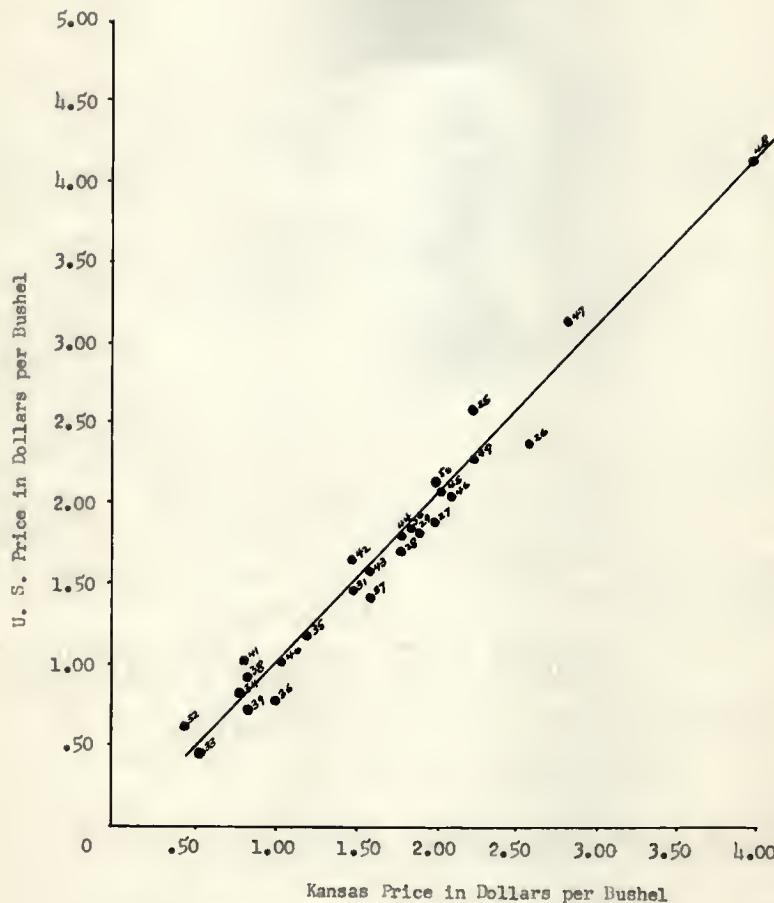


Fig. 4. Relationship between prices received by farmers for soybeans in the United States and Kansas for the month of January, 1925-1950.

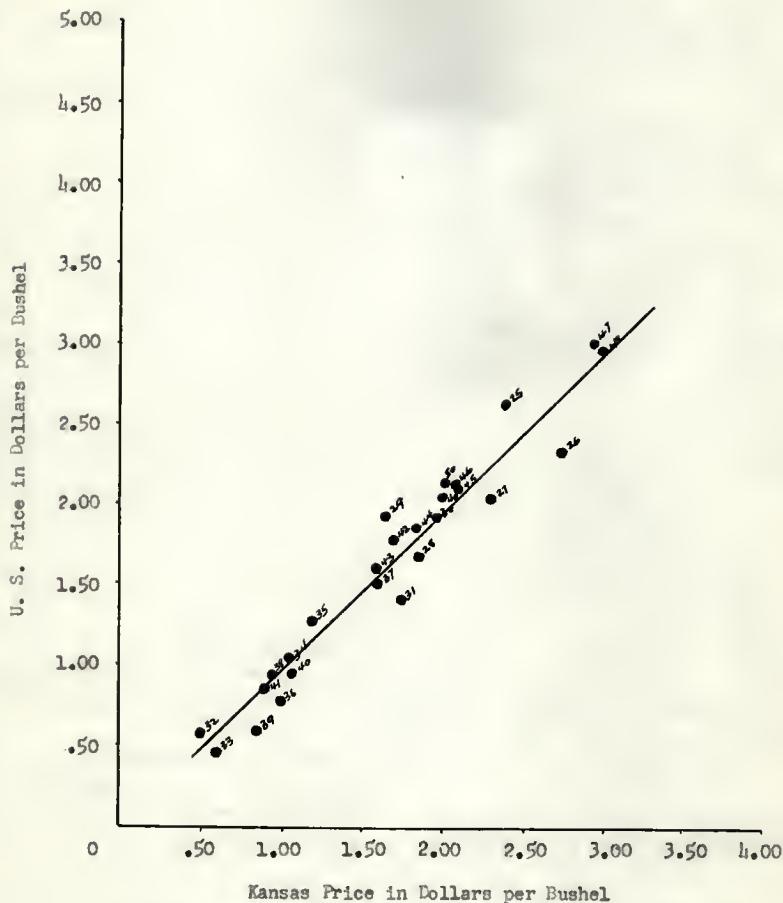


Fig. 5. Relationship between prices received by farmers for soybeans in the United States and Kansas for the month of February, 1925-1950.

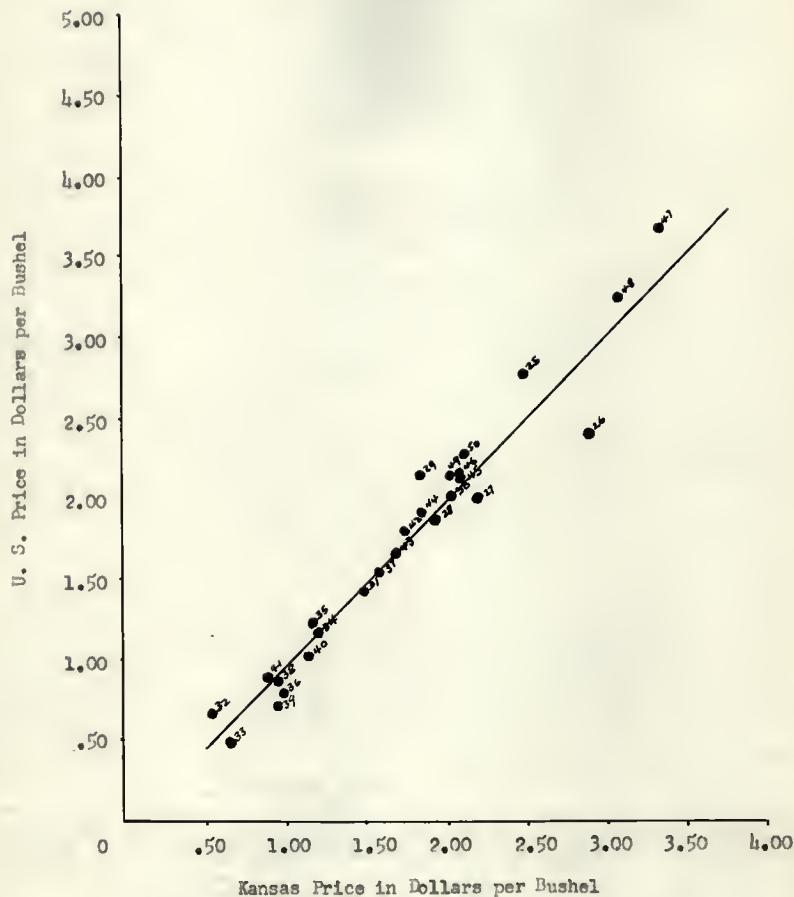


Fig. 6. Relationship between prices received by farmers for soybeans in the United States and Kansas for the month of March, 1925-1950.

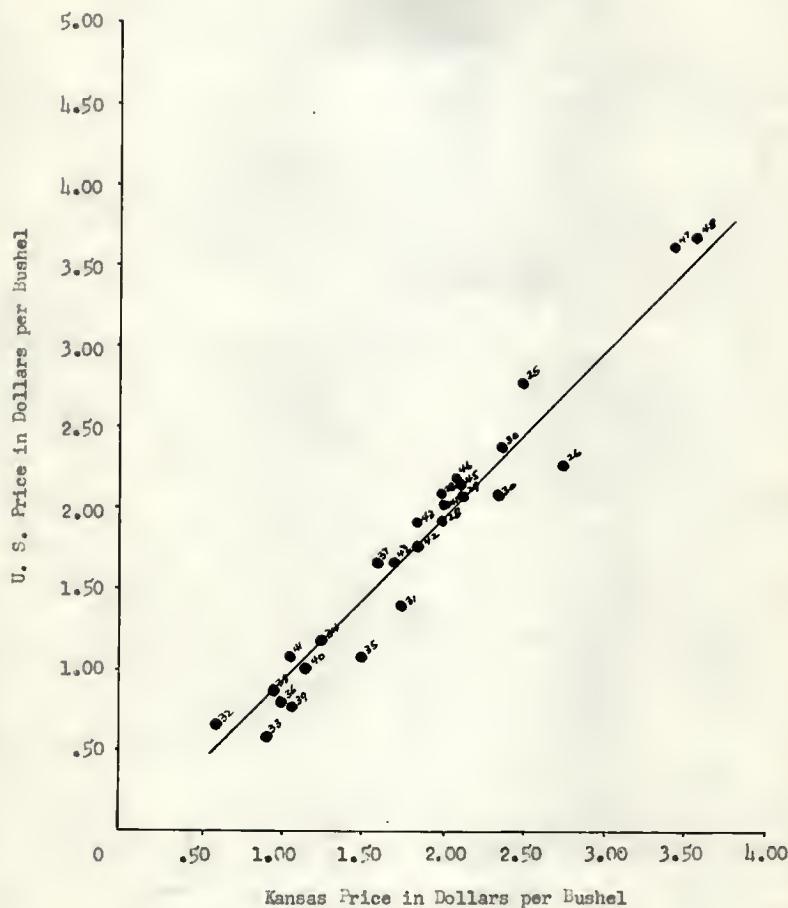


Fig. 7. Relationship between prices received by farmers for soybeans in the United States and Kansas for the month of April, 1925-1950.

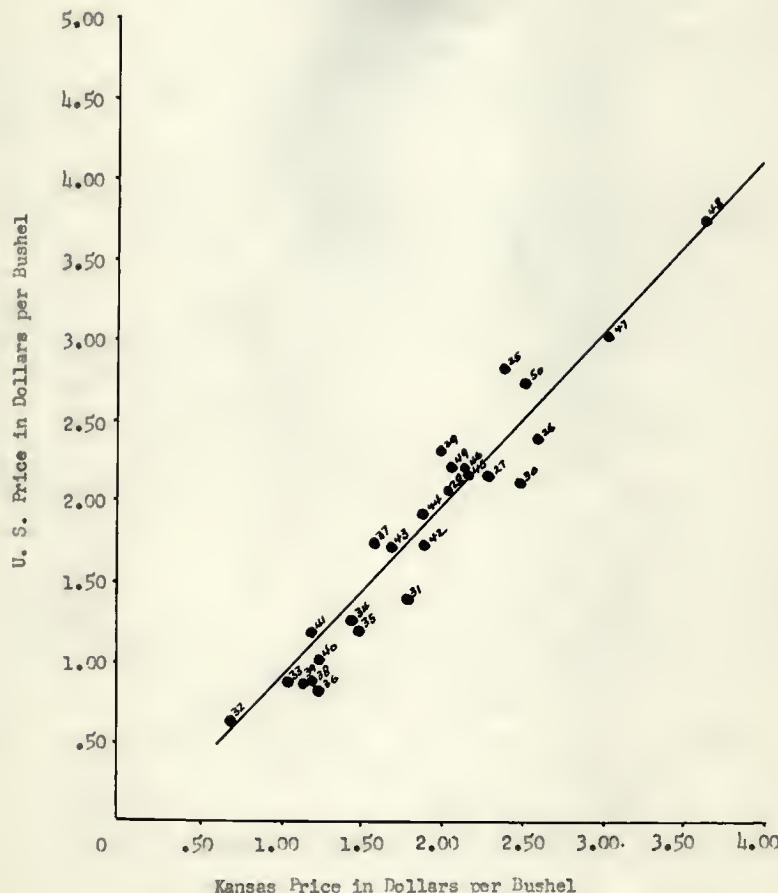


Fig. 8. Relationship between prices received by farmers for soybeans in the United States and Kansas for the month of May, 1925-1950.

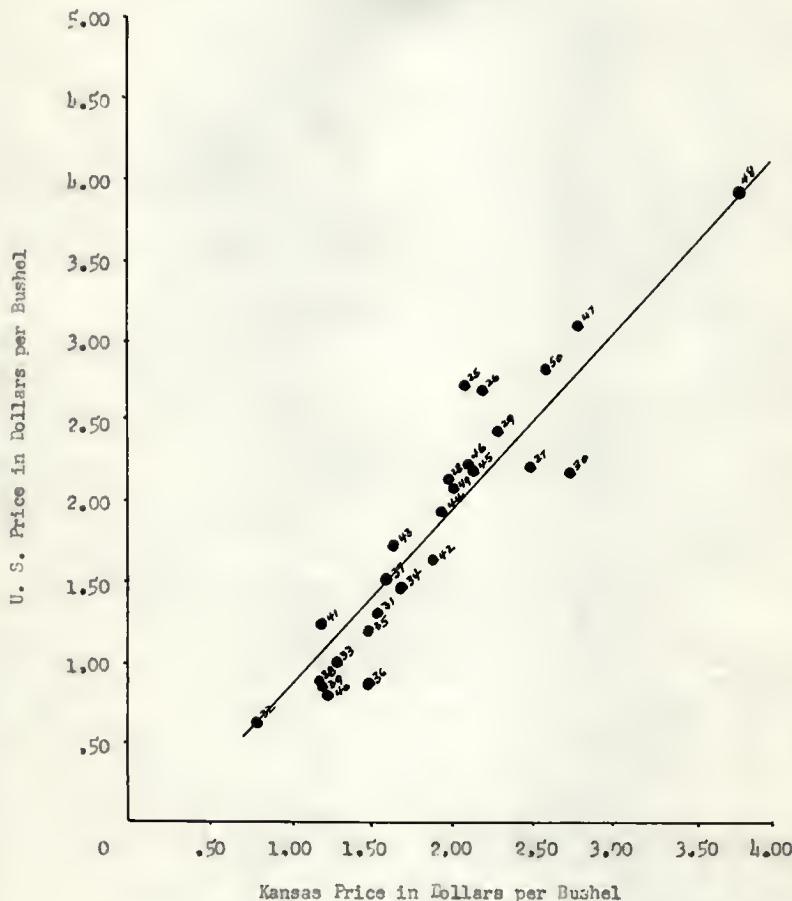


Fig. 9. Relationship between prices received by farmers for soybeans in the United States and Kansas for the month of June, 1925-1950.

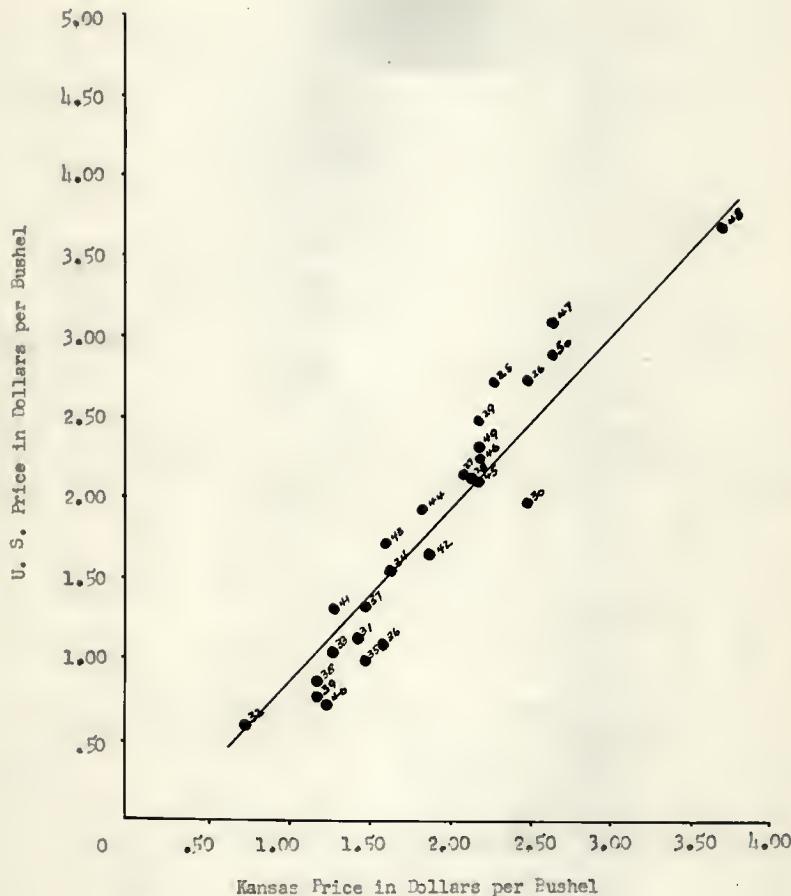


Fig. 10. Relationship between prices received by farmers for soybeans in the United States and Kansas for the month of July, 1925-1950.

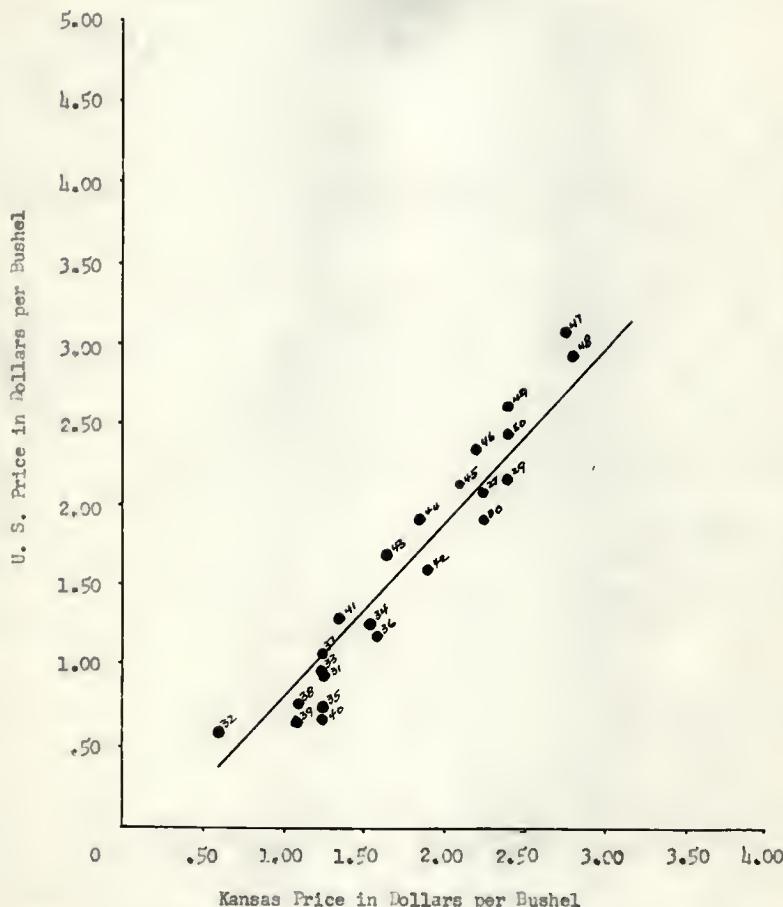


Fig. 11. Relationship between prices received by farmers for soybeans in the United States and Kansas for the month of August, 1925-1950.

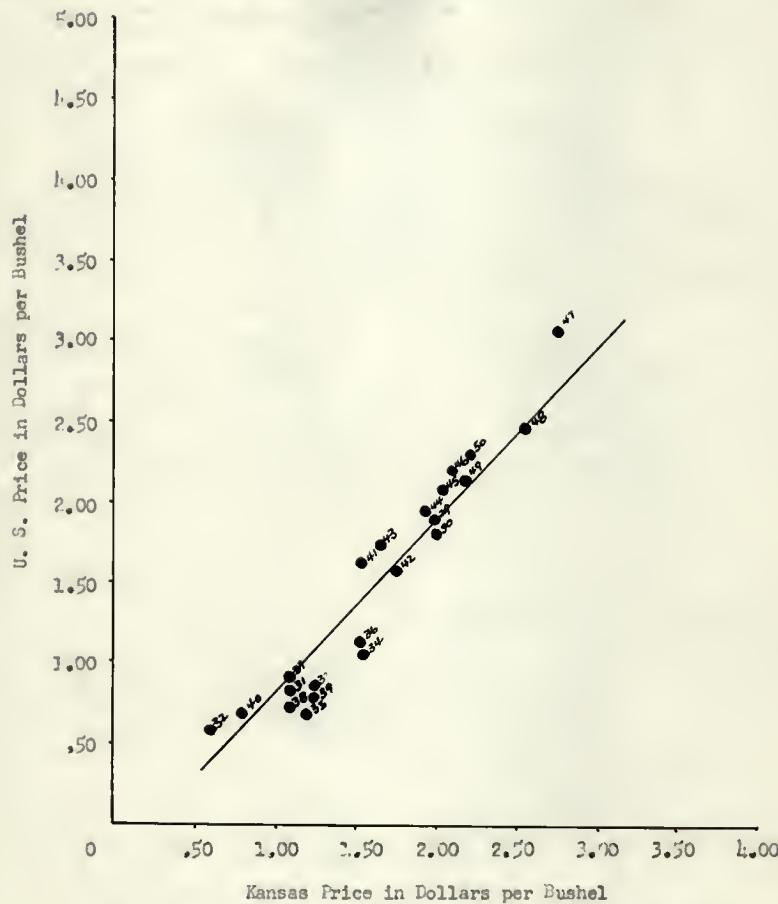


Fig. 12. Relationship between prices received by farmers for soybeans in the United States and Kansas for the month of September, 1925-1950.

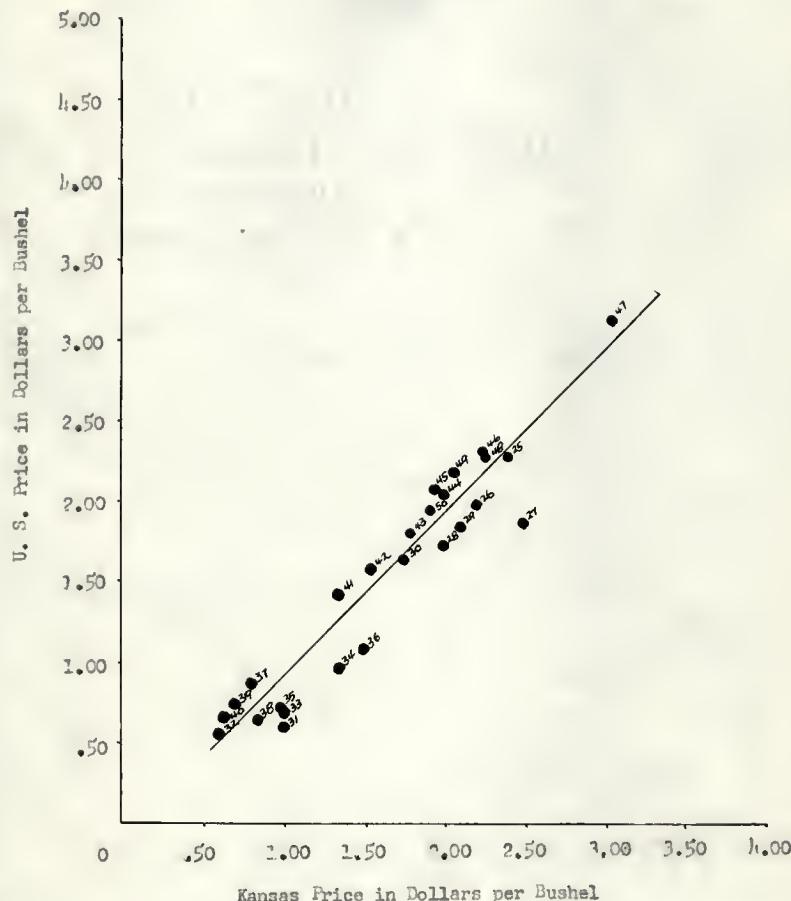


Fig. 13. Relationship between prices received by farmers for soybeans in the United States and Kansas for the month of October, 1925-1950.

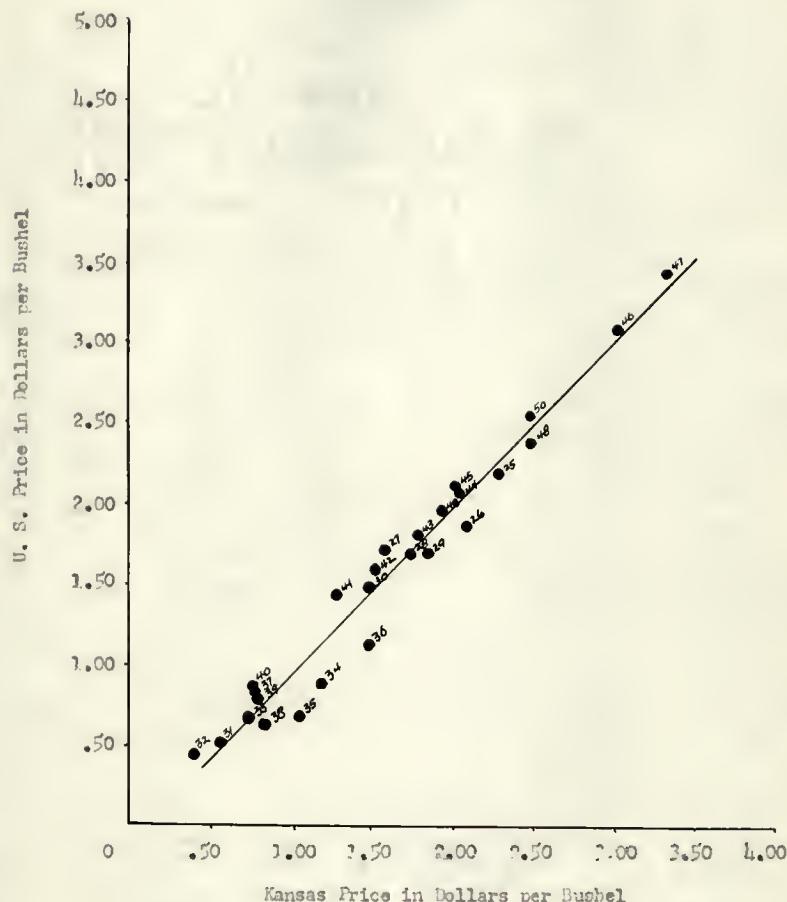


Fig. 14. Relationship between prices received by farmers for soybeans in the United States and Kansas for the month of November, 1925-1950.

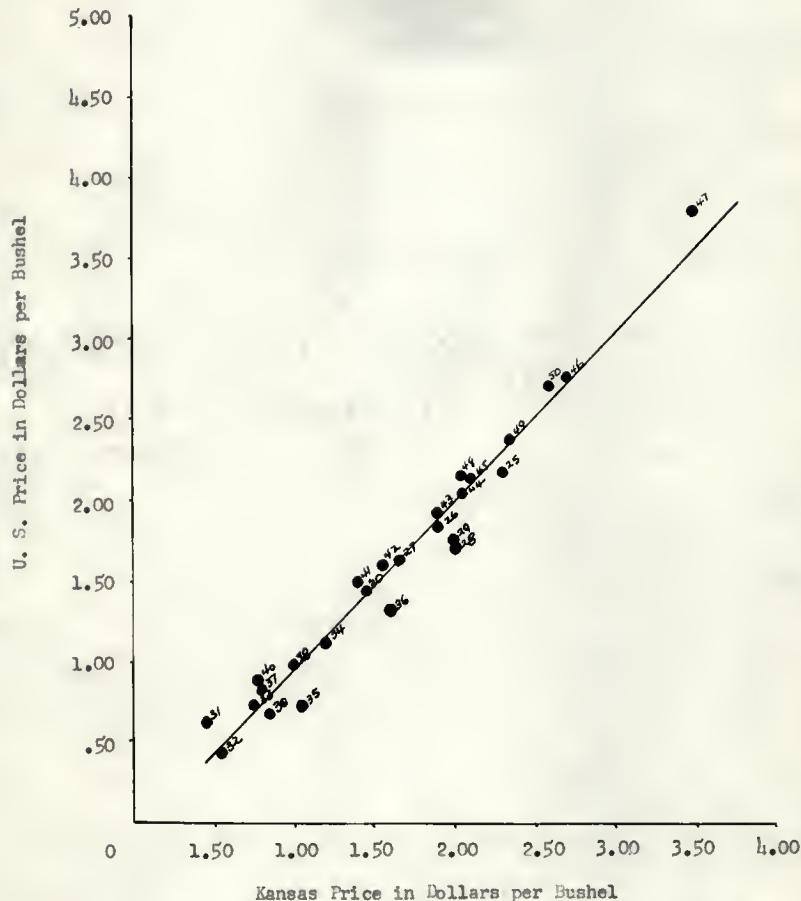


Fig. 15. Relationship between prices received by farmers for soybeans in the United States and Kansas for the month of December, 1925-1950.

## THE RELATIONSHIP BETWEEN COTTONSEED OIL PRICES AND SOYBEAN OIL PRICES

Soybean oil and cottonseed oil are two joint products of the soybean and cottonseed respectively, contributing to the determination of the market value of the respective seeds. Since for many purposes these two oils may be interchanged, a very close relationship between the two price series existed for the period studied, 1936 to 1950, (Figs. 16 to 27.).

The coefficient of correlation between the two price series was calculated for the months of June and October. For the month of June the coefficient of correlation between the two price series was .98. With 13 degrees of freedom, this coefficient was highly significant. A coefficient of .64 is significant at the one percent level, therefore, the correlation between the two price series is well above the one percent level.<sup>1</sup> This indicated a high degree of correlation between the two price series for the month of June.

The coefficient of correlation between the two price series for the month of October was calculated to be .94. With 13 degrees of freedom this coefficient too, was highly significant. Since a coefficient of .64 is significant at the one percent level, the correlation between the two price series for the month of October was significant since it was above the one percent level.

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<sup>1</sup>The number of degrees of freedom is the number of deviations minus the number of constants determined from the sample and used to fix the points from which those deviations are measured.

For the test of significance, reference was made to the textbook Statistical Methods by Snedecor, G. W., p. 149.

Using the coefficients of correlation between the two price series for the months of June and October, expressed as a coefficients of determination, the statement can be made that 96 percent of the variations for June and 88 percent of the variations for October in the soybean oil prices in the United States for the period of 1936 to 1950 were associated with the variations in cottonseed oil prices.

The remaining ten months, by inspection, indicated a like close correlation between the two price series.

Although there is a very close correlation between the two price series it is interesting to note that the price of cottonseed oil is closely correlated to the price of lard. The correlation between the monthly average price of lard and monthly average price of cottonseed oil is .75.<sup>1</sup> It thus appeared that the fluctuation of soybean oil prices were closely related to the welfare of the livestock industry, especially the by-products section.

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<sup>1</sup>Paarlberg, D. Prices of Butter, Lard and Cottonseed Oil. Cornell University Agricultural Experiment Station. Memoir 281, 1948.

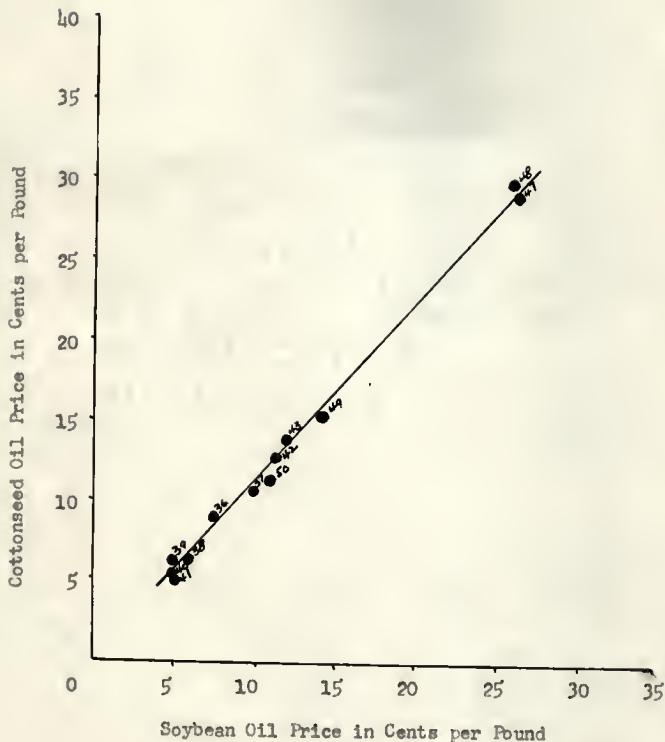


Fig. 16. Relationship in January between soybean oil and cottonseed oil prices in the United States, 1936-1950.

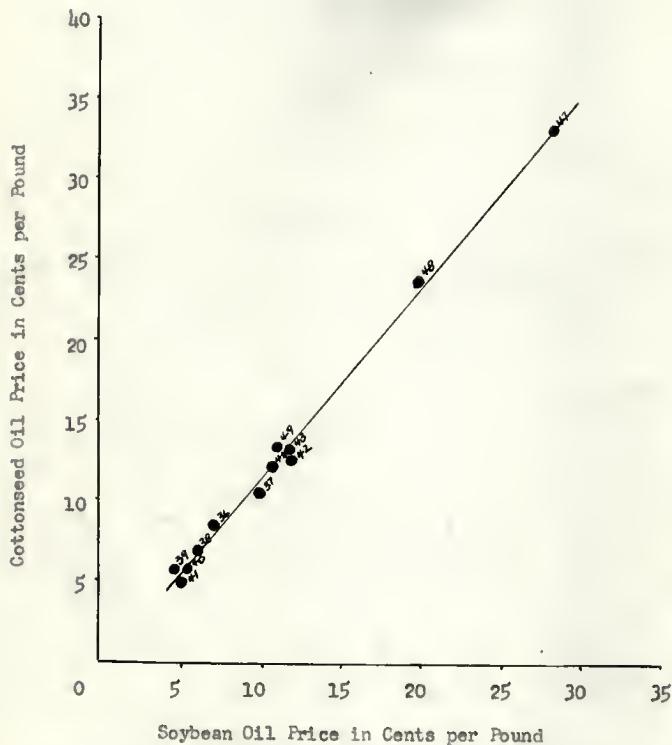


Fig. 17. Relationship in February between soybean oil and cottonseed oil prices in the United States, 1936-1950.

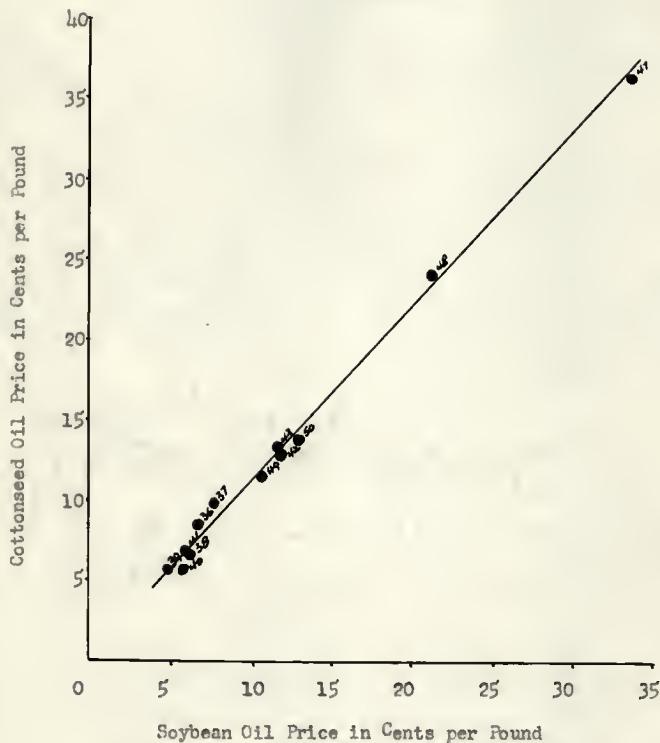


Fig. 18. Relationship in March between soybean oil and cottonseed oil prices in the United States, 1936-1950.

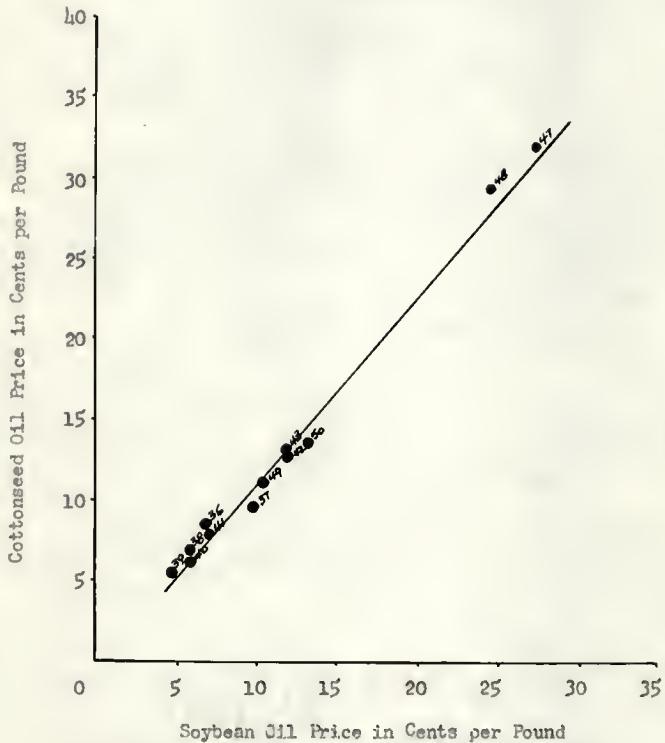


Fig. 19. Relationship in April between soybean oil and cottonseed oil prices in the United States, 1936-1950.

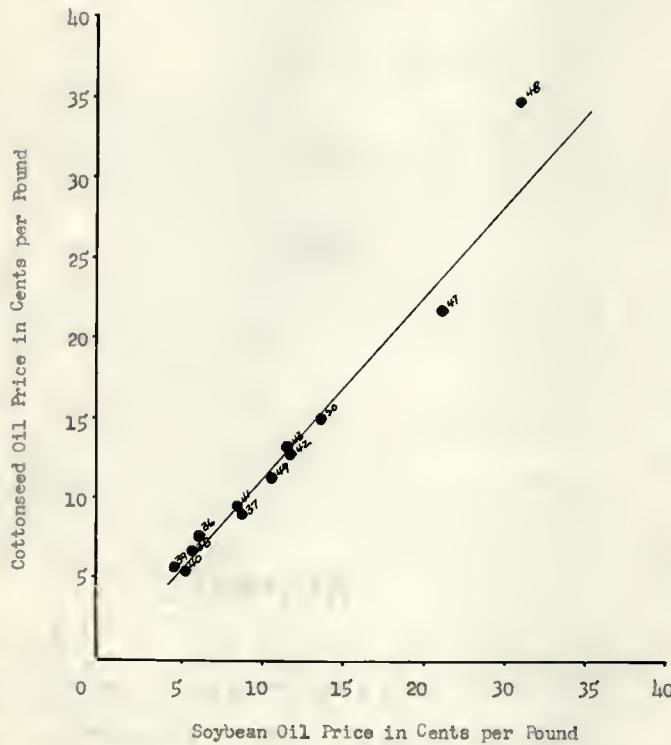


Fig. 20. Relationship in May between soybean oil and cottonseed oil prices in the United States, 1936-1950.

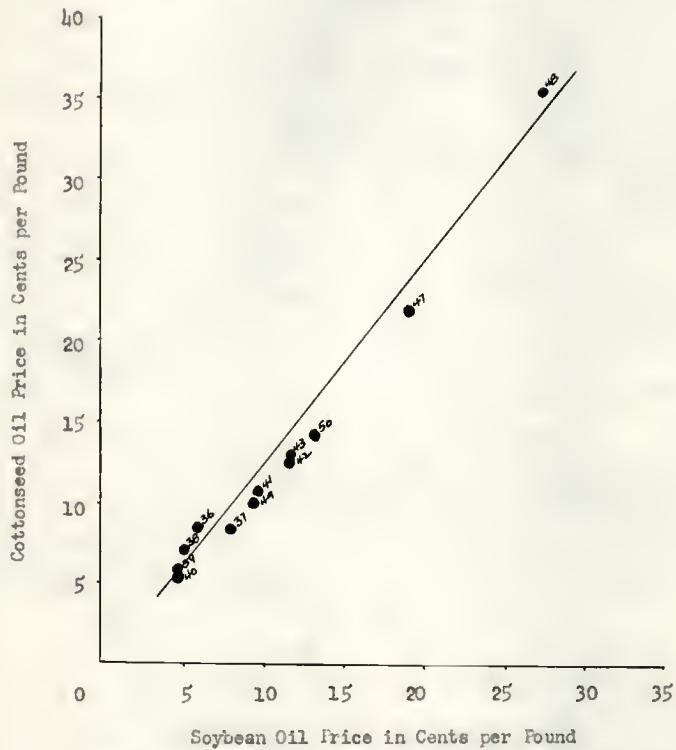


Fig. 21. Relationship in June between soybean oil and cottonseed oil prices in the United States, 1936-1950.

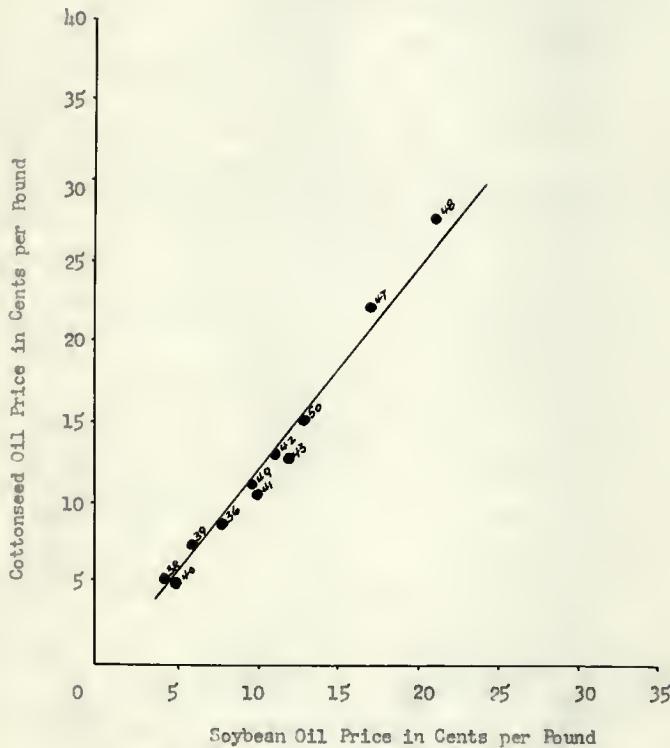


Fig. 22. Relationship in July between soybean oil and cottonseed oil prices in the United States, 1936-1950.

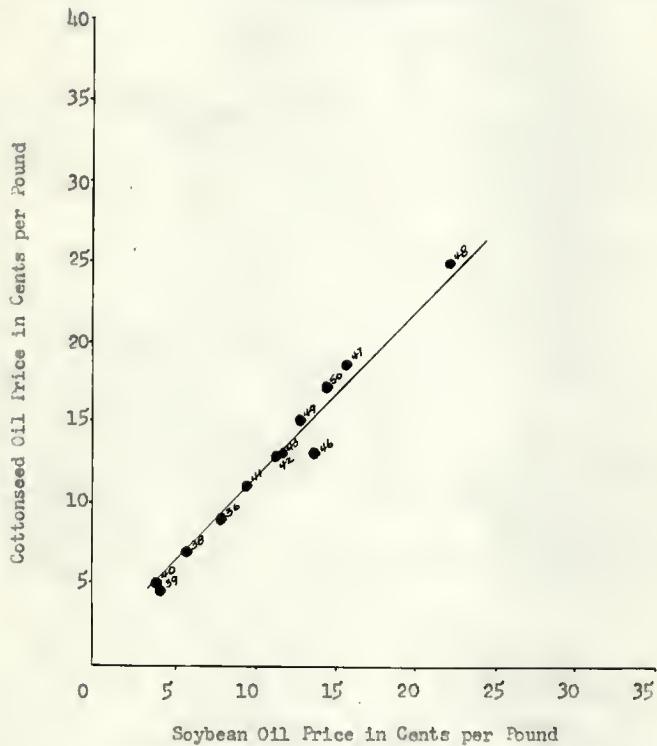


Fig. 23. Relationship in August between soybean oil and cottonseed oil prices in the United States, 1936-1950.

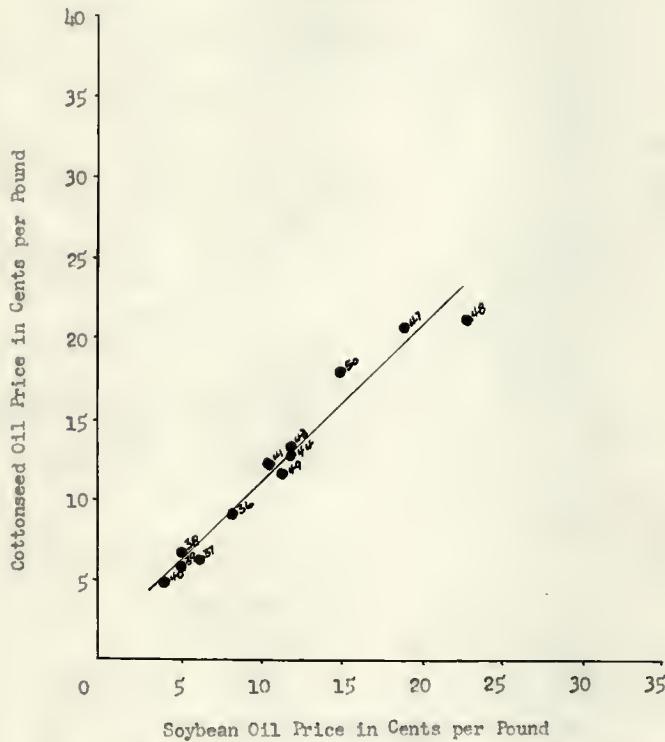


Fig. 24. Relationship in September between soybean oil and cottonseed oil prices in the United States, 1936-1950.

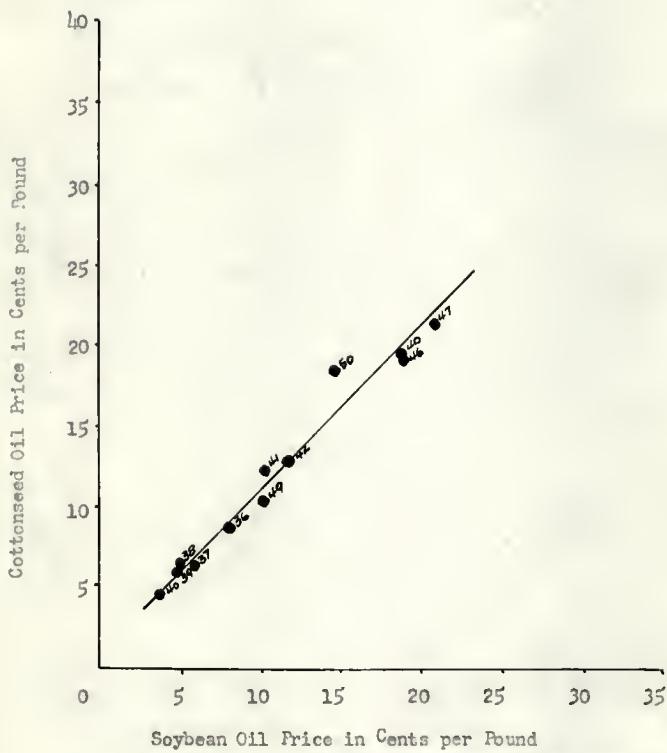


Fig. 25. Relationship in October between soybean oil and cottonseed oil prices in the United States, 1936-1950.

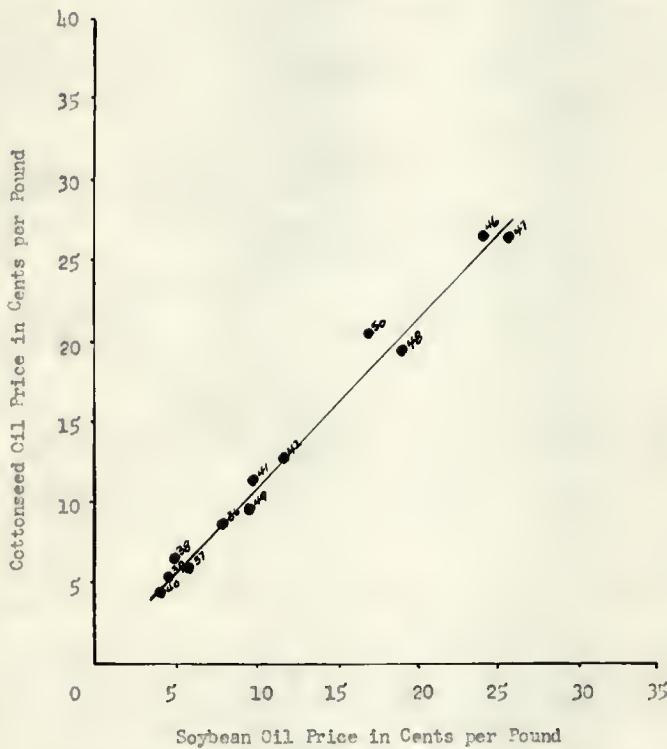


Fig. 26. Relationship in November between soybean oil and cottonseed oil prices in the United States, 1936-1950.

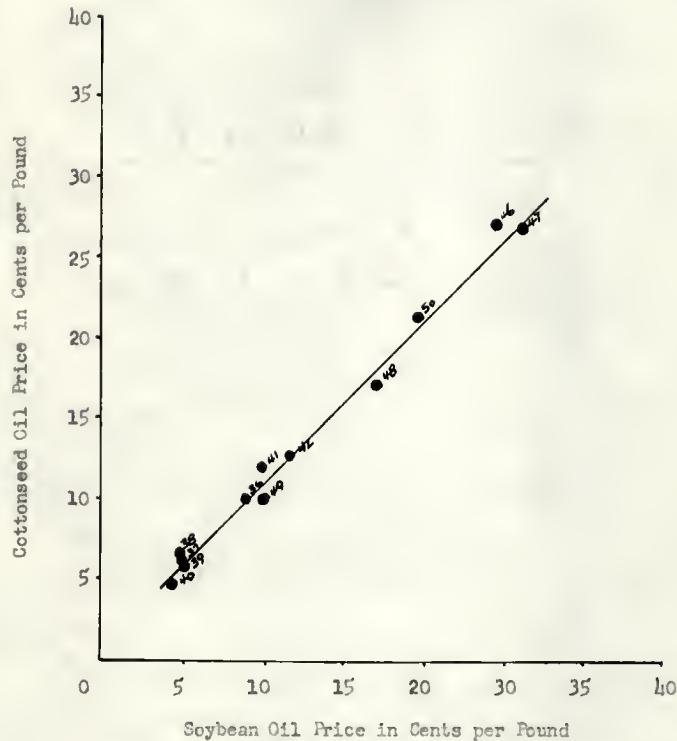


Fig. 27. Relationship in December between soybean oil and cottonseed oil prices in the United States, 1936-1950.

## THE RELATIONSHIP BETWEEN COTTONSEED PRODUCTION AND SOYBEAN PRICES

Since soybeans and soybean products have been subjected to a high degree of competition from cottonseed products it might be assumed that the production of cottonseed would be an important factor in determining the market value of soybeans.

A correlation analysis was made to determine the relationship between cottonseed production and soybean prices. It was assumed that cottonseed production was the independent variable and soybean prices the dependent variable. The period studied was from 1934 to 1950. This period was selected because soybean prices before 1934 and to a limited extent after 1934, did not reflect the true market value of the soybean since soybeans still were not a fully established crop. To a marked degree, soybean prices were greatly affected by the seed requirements at that time.

Fig. 28 indicated the relationship that existed between the two series from 1934 to 1950. Contrary to the expected result, the coefficient of correlation between the two variables was found to be very low, -.17. This low coefficient of correlation between cottonseed production and soybean prices indicated no significant relationship between the two series except that approximately 29 percent of the variations in soybean prices were related to the variations in the cottonseed production.

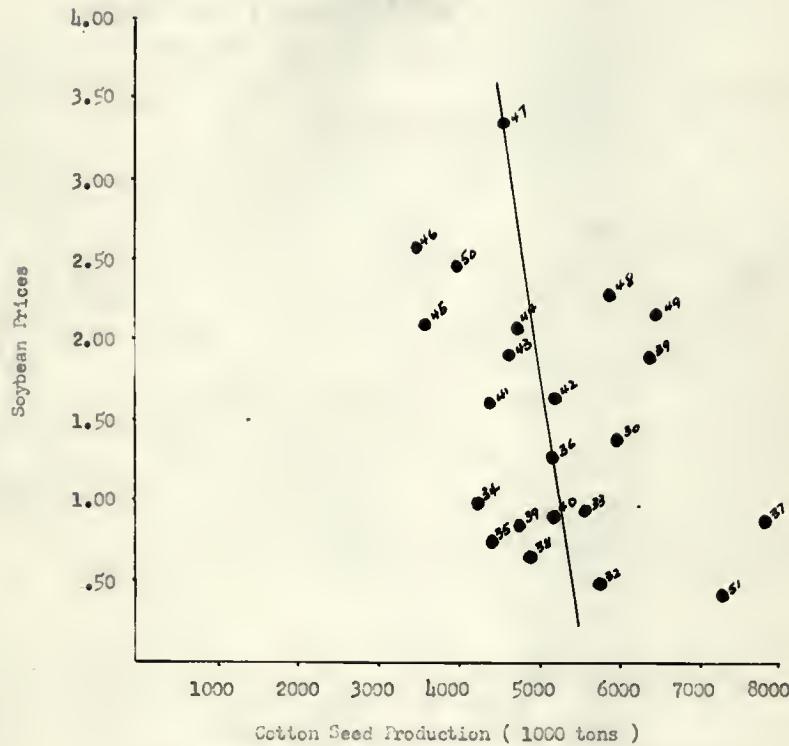


Fig. 28. Relationship between soybean prices and cottonseed production in the United States, 1929-1950.

## SEASONAL MOVEMENT OF SOYBEAN PRICES

### Seasonal Movement of Soybean Prices in the United States

The seasonal movement of the average prices received by farmers for soybeans in the United States for the period of 1925 to 1930 was characterized by a somewhat violent fluctuation. The index of seasonal variations reached its low of 90.3 in October and then rose to a high of 109.5 in June, and subsequently declined regularly to the October low, (Fig. 29). Reasons for this wide seasonal variation of soybean prices have been advanced:

Prices of soybeans swing through a wide seasonal cycle nearly every year, and a major part of the soybeans are marketed by the farmers near the low point of the season. This heavy volume of harvest time selling contributes to a high seasonal demand for freight cars and results in congestion at country elevators, terminal markets, and processing plants every autumn.<sup>1</sup>

The spread is believed to be related to, and largely caused by the heavy marketings by farmers at harvest time, combined with the inability of processors to hedge their purchases to advantage in the "futures" market. Processors have been obliged to carry the price risk, which they are not prepared to do, or to sell oil and meal to actual users for later delivery. These users have demanded and obtained substantial price concessions for carrying risk.<sup>2</sup>

The range of the seasonal soybean price movement in the United States from 1925 to 1950 was 19.3 while the index of irregularity,

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<sup>1</sup>Rollefson, A. W. and others. Improving Soybean Marketing Through Farm Storage. United States Department of Agriculture. Information Bulletin 57. Washington: Government Printing Office, June, 1951.

<sup>2</sup>Jordan, C. L. What Determines Soybean Prices. University of Illinois Agricultural Experiment Station Bulletin 546, 1951, p. 186.

which included 62 percent of the prices, was 7.4. This high index of irregularity indicated that the soybean market, like most agriculture produce markets, is subject to somewhat erratic and unpredictable price movements.

A count was made of the actual number of times that the average monthly price received by farmers for soybeans in the United States was high and low for a particular year and the results are shown in Table 2. Ten months at one time or another, over the period studied, were high for a particular year, however, June and July did show an increased tendency to be high for most of the years. April and October were not high for any year.

The number of times a month was low for a particular year did result in a more distinctive pattern. October, November, December and January were low twenty-four times out of a possible 31.

The month to month movement of prices received by farmers for soybeans in the United States did indicate that a distinct pattern did occur. There was a general advance of prices for the first six months of the year and a general decline in prices for the latter six months of the year, however, with an index of irregularity of 7.4 it did indicate that the magnitude of that variation about the seasonal index made the direction of month to month movement somewhat unpredictable.

As a measure of the conformity of the monthly price behavior to the monthly index, a count was made of the number of years from 1925 to 1950 that the June price was above the February and the October prices within that particular year. It was found that thirteen years

out of the twenty-six years, this situation existed. With a strong seasonal movement of soybean prices as indicated by Fig. 29 it can be said that although the June prices had been higher than the February and October prices only 50 percent of the time, the deviations from this pattern did not have an exceedingly disrupting effect on the seasonal index.

To further analyze the seasonal index of prices received by farmers for soybeans in the United States, the period from 1945 to 1950 was studied, (Fig. 30.).

The period 1945 to 1950 was chosen to illustrate the seasonal pattern in the absence of price controls but with the government loan program in effect. The period of time for which this particular phase of the study was made was relatively short, but it did serve to indicate the general behavior of soybean prices under a set of new conditions.

The pattern of the seasonal movement of soybean prices in the United States, Fig. 30, showed a minor and a major price low. The minor low occurred in February and the major low occurred in October. The range of the fluctuation decreased to 13.9 from the 19.3 figure calculated for the years 1925 to 1950.

Table 2. Average seasonal movement of soybean prices in the United States, 1925-1950.

Month	Average seasonal			Times high or low <sup>1</sup>			Monthly movement <sup>2</sup>		
	Index of			Index of			Times down		
	seasonal	Irregularity	year	month	is high of	is low of	up from	down from	preceding month
	variation	:	year	month	year	month	preceding month	month	month
January	98.1		6.4	2		8	23		1
February	97.9		6.9	2		4	16		9
March	102.4		7.2	3		0	23		3
April	105.4		6.8	0		0	16		8
May	109.3		7.3	2		0	21		5
June	102.5		9.8	5		0	15		10
July	107.8		8.9	5		0	11		15
August	92.7		7.8	2		2	3		22
September	95.7		6.0	1		1	5		21
October	90.3		7.5	0		5	5		20
November	90.4		7.7	1		5	12		12
December	93.1		6.4	4		6	15		7
Total or Average	100.0		7.4	27		31	165		135

<sup>1</sup>Where two months were equal in price and high and low for the year, both were entered.<sup>2</sup>No entry for months of no change from preceding month.

Source: Computed from basic data, Table 7, Appendix.

Table 3. Computation of index of average seasonal variation and index of irregularity for prices of soybeans in the United States, 1925-1950.

Month	Average of items for given month	Index of seasonal variation	Sum of deviations of individual months from seasonal index	Index of Irregularity
January	97.7	98.1	150.4	6.4
February	97.5	97.9	172.6	6.9
March	102.0	102.4	178.9	7.2
April	105.0	105.4	170.0	6.8
May	103.9	109.3	182.8	7.3
June	109.1	109.5	213.8	9.8
July	107.4	107.8	221.6	8.9
August	99.3	99.7	196.1	7.8
September	95.3	95.7	150.1	6.0
October	89.9	90.3	187.0	7.5
November	90.0	90.4	192.2	7.7
December	92.7	93.1	159.1	6.4
Total	1194.8	1199.6	2213.6	7.4

Source: Computed from basic data, Table 7, Appendix.

Index of Soybean Prices

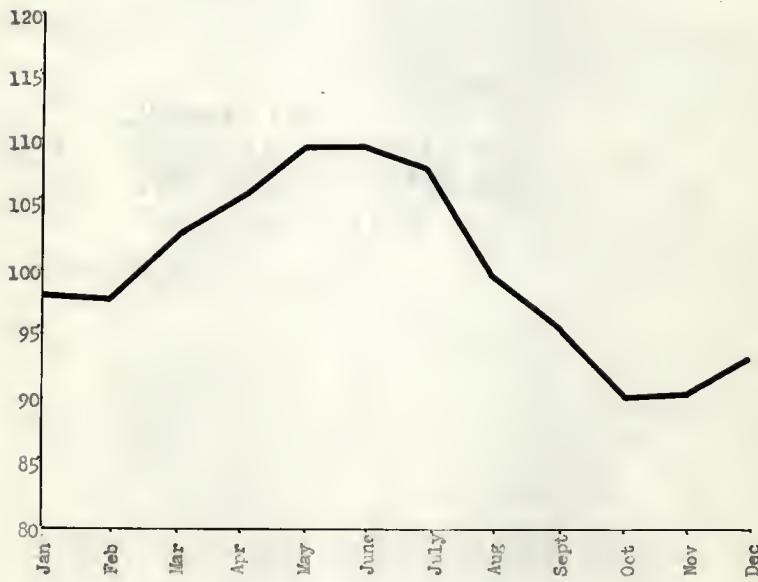


Fig. 29. Index of average seasonal variation of prices received by farmers for soybeans in the United States, 1925-1950.

## Index of Soybean Prices

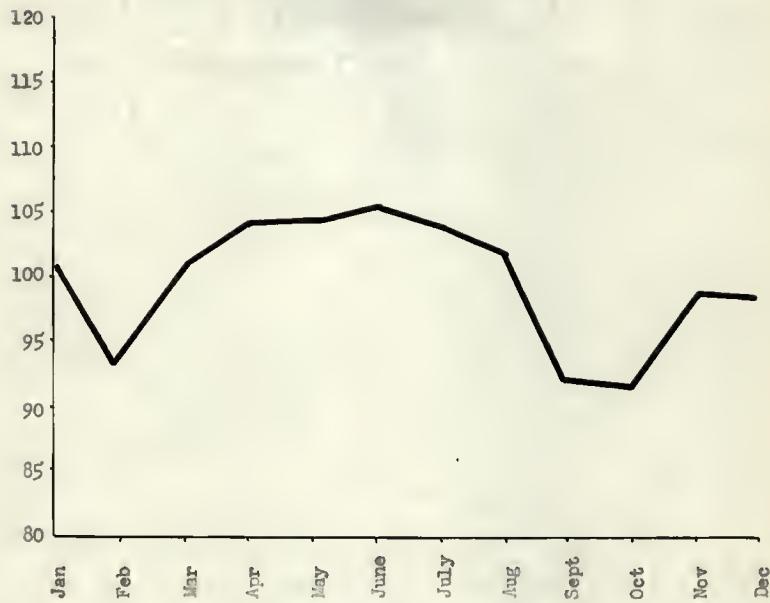


Fig. 30. Index of average seasonal variation of prices received by farmers for soybeans in the United States, 1945-1950.

### Seasonal Movement of Soybean Prices in Kansas

The seasonal movement of soybean prices received by farmers in Kansas followed closely the pattern of soybean price movement in the United States, (Fig. 31). The range of the variation was 25.0; from a high of 113.0 which occurred in June to a low of 88.0 which occurred in November.

The index of irregularity was 8.4, which was approximately one third the range of the seasonal fluctuation. This high index of irregularity was a reflection of the times each month was high or low for a particular year, for the period from 1925 to 1950. June and July were high 21 times out of a possible 50 times. October, however, was the only month that was not high in any particular year.

Ten months were low for a particular year at one time or another, but October, November, December and January were low 27 times out of a possible 40 times. The months of May and August were not low for any year.

The general month to month movement of soybean prices followed a definite pattern, a regular increase from January to June and a regular decline from July to December, (Table 5.).

As a measure of the conformity of the actual price to the seasonal index it was found that the June price was above the February price and the November price 16 times out of a possible 26 times. Although this price relationship did occur only 62 percent of the time the various other monthly relationships tended to compensate each other, enabling a strong seasonal price index to be established but with a high index of irregularity.

Table 4. Computation of index of average seasonal variation and index of irregularity for prices of soybeans in Kansas, 1925-1950.

Month	Average of items for given month	Index of seasonal variation	Sum of deviations of individual months from seasonal index	Index of irregularity
January	91.2	91.6	225.2	9.1
February	89.7	90.1	204.5	8.2
March	97.2	97.7	170.4	6.8
April	103.1	103.9	155.2	6.2
May	109.5	110.0	176.0	7.0
June	112.5	113.0	258.1	10.3
July	110.9	111.4	217.5	9.9
August	106.0	106.5	177.2	7.1
September	104.5	105.0	216.6	8.7
October	92.5	92.0	221.2	8.9
November	87.6	88.0	252.7	10.1
December	89.1	89.8	221.7	8.9
Total	1194.4	1200.0	2526.3	8.1

Source: Computed from basic data, Table 11, Appendix.

Table 5. Average seasonal movement of soybean prices in Kansas, 1925-1950.

Month	Average seasonal	Times high or low <sup>1</sup>	Monthly movement <sup>2</sup>			
	Index of seasonal variation	Index of irregularity	Times month is high of year	Times month is low of year	Times up from preceding month	Times down from preced- ing month
January	91.6	9.1	2	9	17	5
February	90.1	8.2	1	5	16	3
March	97.7	6.8	3	2	16	2
April	103.9	6.2	3	2	14	3
May	110.0	7.0	6	0	19	3
June	113.0	10.3	11	2	9	8
July	111.4	9.9	10	1	9	10
August	105.5	7.1	5	0	6	14
September	105.0	8.7	2	1	4	15
October	93.0	8.9	0	7	7	17
November	88.0	10.1	3	6	9	12
December	89.8	8.9	4	5	11	4
Total or Average	100.0	8.4	50	40	137	96

<sup>1</sup>Where two months were equal in price and high and low for the year, both were entered.<sup>2</sup>No entry for months of no change from preceding month.

Source: Computed from basic data, Table 11, Appendix.

The factors which caused this wide cycle of seasonal soybean price fluctuation in Kansas were believed to be the same factors which had caused the wide seasonal fluctuation of the soybean prices in the United States, however, the influence of those factors may not have been of equal strength.

In order to discover whether the pattern of the seasonal movement of soybean prices had changed since the end of World War II an index was computed for the period between 1945 and 1950 as shown by Fig. 3h. The range of the seasonal movement was much smaller. For the period of 1925 to 1950 it was 25.0 while for the period of 1946 to 1950 it was 13.0.

Not unlike the seasonal pattern prices for the United States as a whole, the result for Kansas exhibited a minor and a major seasonal price depression. The minor price decline occurred in February and the major price decline occurred in October.

The most interesting feature of the seasonal movement of soybean prices in Kansas and the United States in the post war period was the development of the minor seasonal price decline in February. As shown by Figs. 30 and 3h, the seasonal price decline in February for the period between 1945 and 1950 was severe. This condition is not likely to be permanent and will not be so evident when the seasonal is calculated over a period of a greater number of years.

As shown by Tables 9 and 13 of the appendix, the sharp seasonal price decline in February was a reflection of the sudden drop in the price of soybeans from January to February of 1948. A short crop of soybeans in 1947 had driven the price of soybeans, in January of 1948, to over

four dollars per bushel, an unprecedented price that could not be maintained. This short crop of soybeans in 1947 had greatly affected the seasonal movement of prices throughout that year, as the price movements did not conform to the conventional past movements.

#### A Comparison of the Seasonal Price Movements of Soybeans in the United States and Kansas

Although the seasonal movement of prices received by farmers for soybeans in Kansas and the United States were of the same pattern, the seasonal low in Kansas was lower than the seasonal low in the United States, and the seasonal high in Kansas was higher than the seasonal high in the United States, (Fig. 32.)

Kansas is on the fringe area of the main soybean producing region of America and it was believed that this removal from the central markets reflected the market price fluctuations to the Kansas farmer in a magnified form. As a result price increases in the central market would result in greater increase in prices, percentagewise, to farmers farther removed from the central market than to those in close proximity of the central market. The reverse situation would be in effect for a price decline.

Another reason for the wider fluctuation of the seasonal price movements of soybean prices in Kansas than in the United States may be due to reluctance of soybean processors to provide adequate storage facilities for the soybeans harvested in Kansas, since Kansas is not a major soybean producing state.

The problem confronting the soybean grower, in the face of such wide seasonal fluctuation of soybean prices, is whether to sell during

harvest time or store for future sales. There is evidence that with such a wide range of seasonal soybean price fluctuation, the net returns would be increased if the storage of soybeans was engaged in by the farmer.

In 3 of the 4 post-war years, soybean storage paid well. Of the farmers who stored 1500 bushels in each crop year from 1946-47 through 1949-50, those who sold the beans at the average December-January price earned, for the four years, \$1800 more than they would have received at harvest time; those who sold at the average March-April-May-June price received \$2300 extra; and those who anticipated market changes well enough to sell within 25 cents a bushel of the seasonal peak price received at least \$3000 extra.<sup>1</sup>

The figures quoted were a net gain from sales for the four years after paying storage costs. With such net gains possible through storage, the common practice of growing soybeans as a cash crop, to tide over the farmer between the wheat and corn harvest, appears to have little merit.

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<sup>1</sup>Rollefson, A. M. and others. op. cit. p. 11.

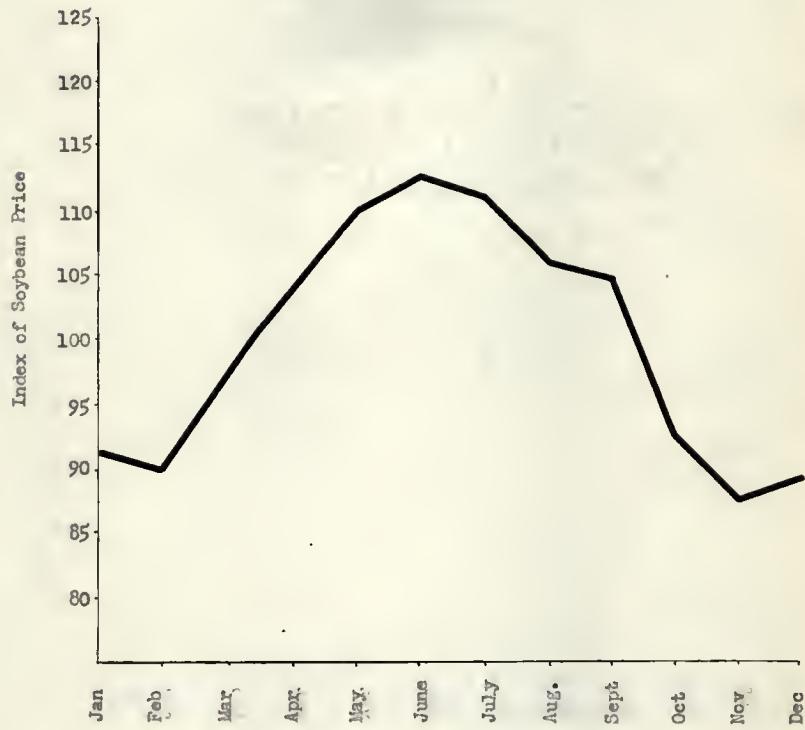


Fig. 31. Index of average seasonal variation of prices received by farmers for soybeans in Kansas, 1925-1950.

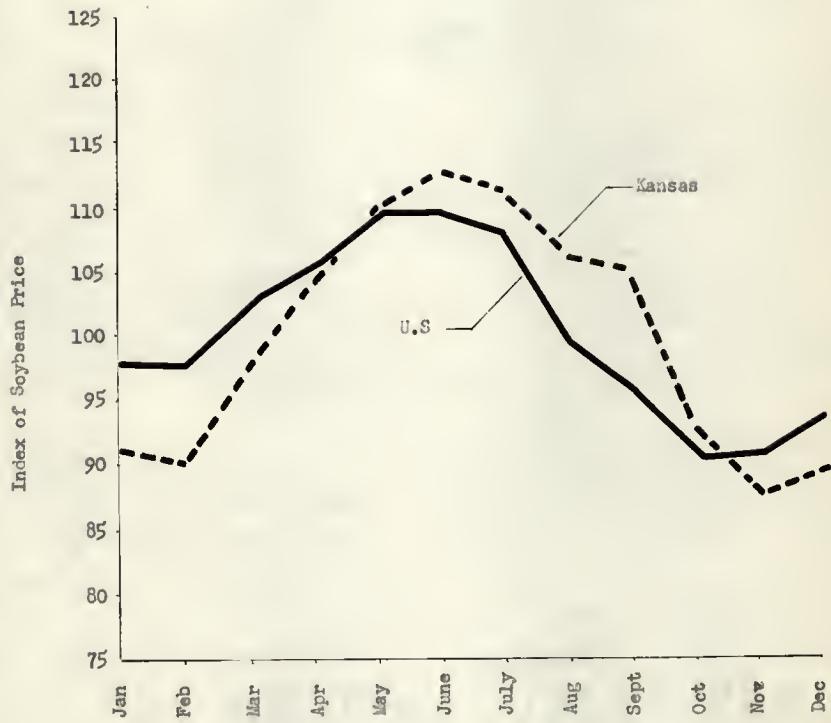


Fig. 32. Index of average seasonal variation of prices received by farmers for soybeans in the United States and Kansas, 1925-1950.

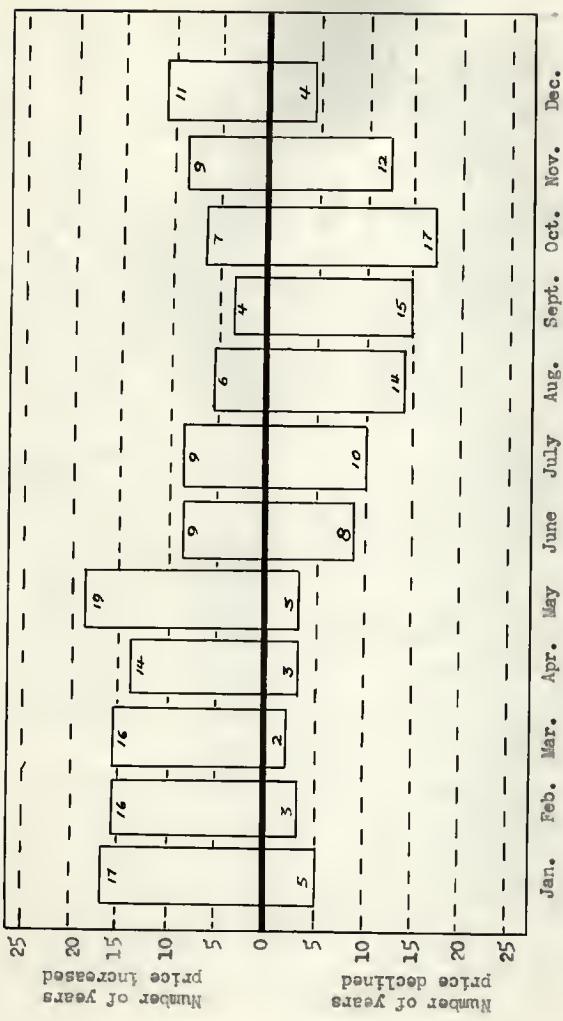


FIG. 33. Number of times during twenty-six crop years that the monthly price received by farmers for sorghums in Kansas was higher or lower than the previous month, 1925-1950.

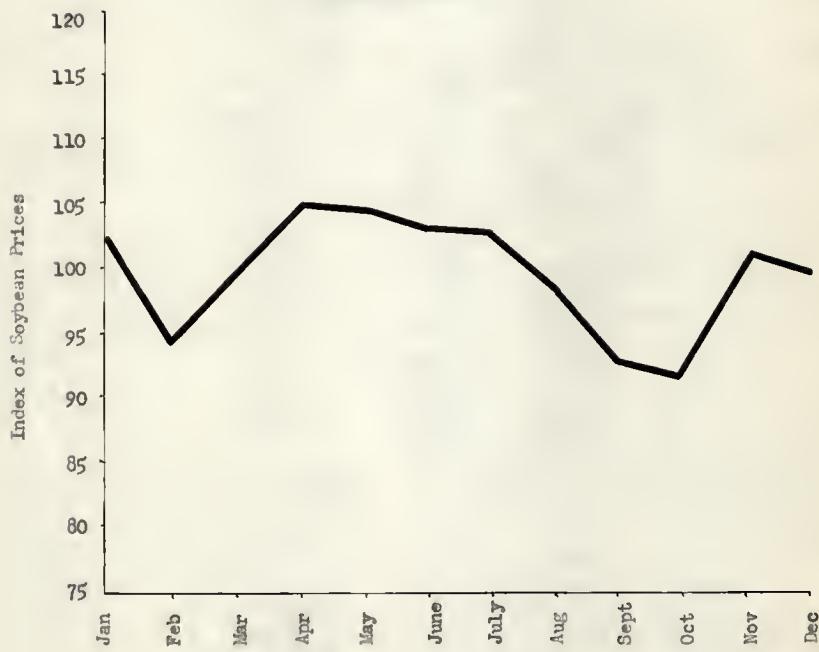


Fig. 34. Index of seasonal movement of prices received for soybeans by farmers in Kansas, 1945-1950.

### SEASONAL PRICE MOVEMENT OF SOYBEAN MEAL

The index of seasonal variation of soybean meal prices in the United States from 1936 to 1950 did not exhibit the distinctive seasonal movement that was exhibited by the seasonal movement of soybean prices. The more steady demand for soybean meal throughout the season for livestock feeding, the availability of the soybean meal throughout the season and the addition of marketing margins to the final product tended to dampen the possibility of the reflection of the seasonal price variation of soybeans in the soybean meal market.

The pattern of the seasonal variation of soybean meal prices can be divided into two six month periods; a period of generally low prices from January to June, and a period of higher prices from July to December (Fig. 35). During the six month period of relatively higher prices a distinctive decline in the seasonal index occurred in October. This was attributed to the heavy marketing of soybeans by farmers during that month.

The range of the variation of the seasonal index of soybean meal prices in the United States was 8.4 percent; from a low of 95.8 which occurred in March to a high of 104.2 which occurred in September and December.

The general rise in the seasonal index from July to December reflected heavier demand for soybean meal for livestock feeding since at that time of the year grass fed cattle are being moved into feed-lots and cattle feeders are generally stock-piling soybean meal for future needs.

The average index of irregularity was 6.2, only slightly less than the range of seasonal variation which was found to be 8.4. The lowest index of irregularity, 3.1 occurred in October, which was a result of the impact of heavy marketing of soybeans at that time of the season..

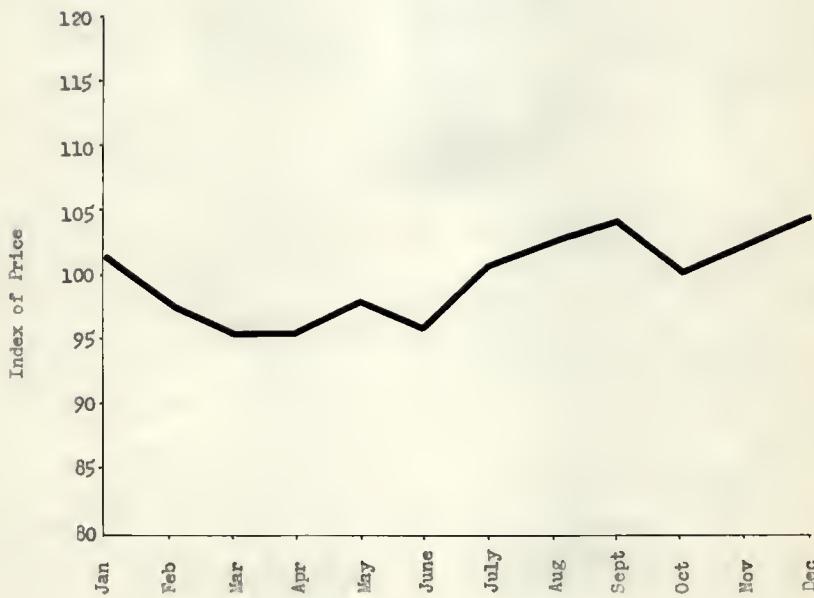


Fig. 35. Index of average seasonal variation of prices of soybean meal in the United States, 1936-1950.

Table 6. Computation of index of average seasonal variation and index of irregularity for prices of soybean meal in the United States, 1936-1950.

Month	Average of items for given month	Index of seasonal variation	Sum of deviations of individual months from seasonal index	Index of irregularity
January	101.1	101.8	78.6	5.6
February	97.5	98.1	81.5	5.8
March	92.5	95.8	90.6	6.5
April	93.5	95.9	99.7	7.1
May	97.5	98.1	80.6	5.8
June	95.2	95.8	72.1	5.2
July	100.2	100.9	107.5	7.7
August	102.0	102.7	130.3	9.3
September	103.5	104.2	107.1	7.7
October	99.5	100.1	143.2	3.1
November	101.7	102.4	76.6	5.5
December	103.5	104.2	70.3	5.0
Total	1192.2	1200.0	1038.1	6.2

Source: Computed from basic data, Table 15, Appendix.

## SEASONAL PRICE MOVEMENT OF SOYBEAN OIL

The seasonal price movement of soybean oil in the United States from 1936 to 1950, not unlike the seasonal price movement of soybean meal, did not reflect the violent seasonal fluctuation of soybean price, (Table 5). The range of the fluctuation was 8.6; from a high of 104.8 which occurred in March to a low of 96.2 which occurred in October. A fairly low seasonal price index, 96.5 occurred in June; only .3 higher than the seasonal low in October. Since a high degree of correlation was found to exist between cottonseed oil prices and soybean oil prices, (Fig. 36), it was considered that the low index in June was partly caused by the harvest of the cotton crop at that time of the season. Another reason that would seem to contribute to a decline of soybean oil prices in June would be the arrival of fall pigs on the market during May, depressing the price of lard and consequently the price of its competitor, soybean oil.

The seasonal movement of soybean oil prices can also be divided into two six-month periods; a period from May to October which was characterized by a general decline in price and a period from November to April which indicated a general rise in soybean oil prices.

The index of irregularity of the movement of soybean oil prices was 7.4, which was only 1.2 less than the range of seasonal price movement. The lowest index of irregularity of 5.6 was found in the month of October, which reflected the heavy marketings of soybeans during that month. The shaded band area depicting the index of irregularity did not move away from the base line represented by 100 on the figure.

This meant that while there was seasonal movement present there was little expectation that it would be realized in a particular year.

When a comparison of the index of the seasonal price variation of soybean meal and soybean oil was made, an almost perfect inverse relationship existed, (Fig. 37).

The price users have paid for soybean oil and soybean meal have both contributed to the establishment of the market value of the soybean. When Fig. 37 was examined it appeared that a declining price of one of the joint products, which would have tended to lower the price of the soybean, was offset by an increasing price of the other joint product.

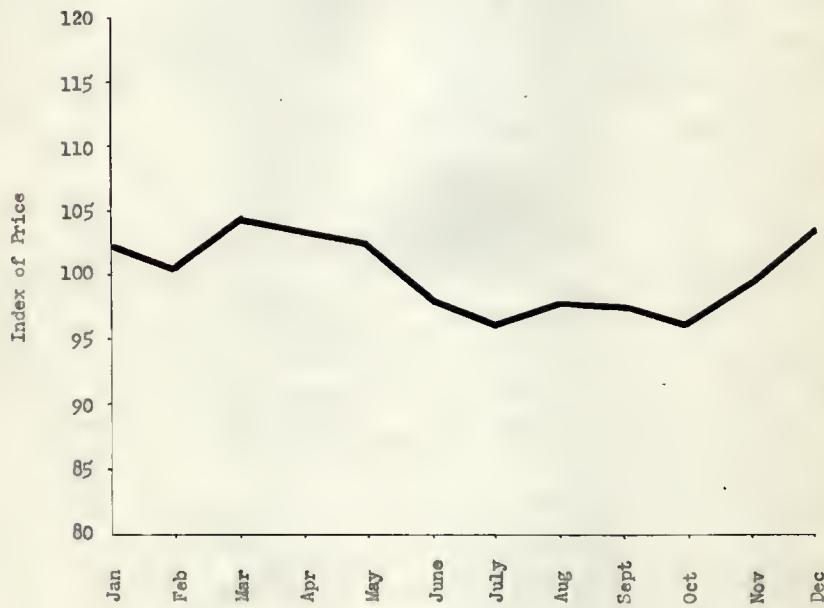


Fig. 36. Index of average seasonal variation of prices of soybean oil in the United States, 1936-1950.

Table 7. Computation of index of average seasonal variation and index of irregularity for prices of soybean oil in the United States, 1936-1950.

Month	Average of items for given month	Index of seasonal variation	Sum of deviations of individual months from seasonal index	Index of irregularity
January	102.1	102.6	98.7	7.1
February	100.1	100.6	119.8	8.6
March	101.2	101.8	151.1	10.8
April	103.2	103.7	85.3	6.1
May	102.1	102.6	79.7	5.7
June	98.1	98.6	110.9	7.9
July	96.0	96.5	106.2	7.6
August	96.9	97.5	116.3	8.3
September	96.8	97.3	123.1	8.8
October	95.7	96.2	50.7	5.6
November	98.7	99.3	104.1	7.4
December	99.7	100.3	95.9	6.9
Total	1193.6	1200.0	1241.8	7.4

Source: Computed from basic data, Table 19, Appendix.

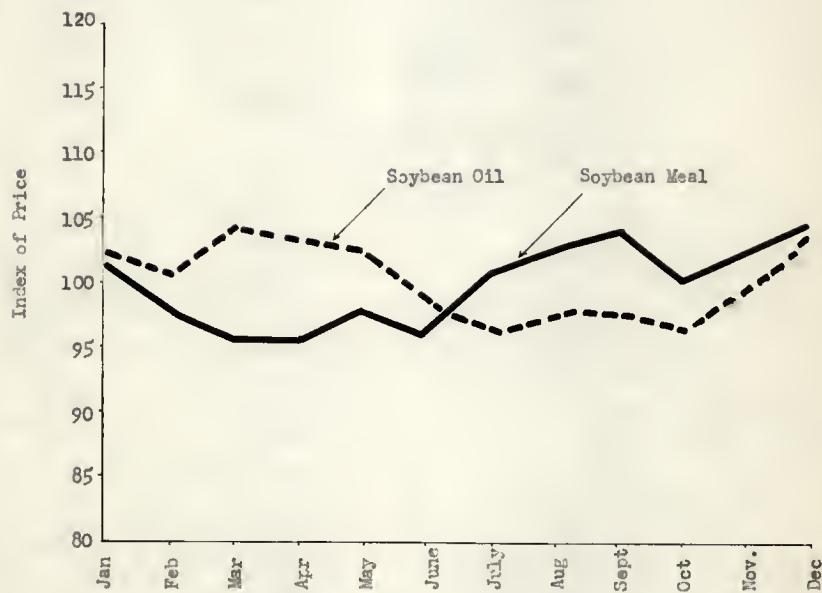


Fig. 37. Index of average seasonal variation of prices of soybean oil and soybean meal in the United States, 1936-1950.

SOYBEAN PROCESSING IN KANSAS<sup>1</sup>

## General

The processing of soybeans to produce oil and meal is an old industry in the Orient where rather primitive equipment is still used. In the United States, the soybean industry is a comparatively new one, having been developed almost entirely within the past 25 or 30 years.

The early processors were faced with a task of developing a market for their still untried products. Initially, little was known concerning the value of soybean oil meal for feeding purposes. Stock feeders had to be persuaded to accept free batches of meal for feeding trials, while at the same time meal was sent to various state experiment stations where controlled feeding experiments were carried out. In due time soybean oil meal had established itself as a valuable protein supplement in the feed industry.

Similarly, the first domestically produced soybean oil found an unreceptive market. It was not known that soybean oil could be refined, bleached and deodorized to produce an edible product, and its value in the drying oil industry was equally uncertain.

Kansas was first introduced to the oilseed processing industry in 1890, when a plant was constructed in south east Kansas. Although this plant was principally used for the processing of flax seed, with

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<sup>1</sup>Based largely on the result of interviews held with soybean processors in Kansas.

the existing facilities, it was equally capable of processing soybeans. Through the life of this mill, flaxseed and soybeans had been processed alternately and it was in 1926 that soybeans began to play the leading role in the operation of Kansas' first plant.

It was not until the 1940's that the soybean processing industry began to permanently establish itself in Kansas. This of course was the result of the increased production of soybean in Kansas. Until 1940, only one mill capable of processing soybeans existed in Kansas, and its daily capacity was less than 1000 bushels of soybeans per day. However, from 1940 to 1945 an additional six mills were constructed and the processing capacity was increased by approximately 2000 per cent.

Table 8. Kansas Soybean Mills

Plant No. :	Date of Construction :	Capacity : bus. per day	Process :	Storage Facilities : bus.
1	1940	7000	solvent and expeller	250,000
2	1945	1500	expeller	230,000
3	1945	2000	expeller	300,000
4	1890	5000	expeller	900,000
5	1943	4600	solvent	65,000
6	1942	1200	expeller	225,000
7	1945	1000	solvent	93,000

Source: Based on information received from individual processors

### Methods of Soybean Processing

Only three methods are commonly used to process oil and meal, namely continuous pressing (expellers and screw presses), hydraulic pressing and solvent extraction. It was found that all three methods were at one time or another in operation in Kansas. However, at the present time, and since 1940 the expeller and the solvent processes have been exclusively used.

Two of the advantages of the solvent system over the expeller system are: 1, a higher recovery of oil and 2, the lower cost of operation per bushel of grain processed due to the decreased amount of hand labor required. While the expeller method yielded a meal containing 4-5 percent oil, solvent extracted meal contained less than 1 percent oil.

Because of the high overhead associated with soybean processing operations, the processors which were interviewed stated that it was necessary to operate the equipment almost the year round and on a twenty-four hour basis in order to achieve minimum conservation costs.

Along with the general processing equipment which characterized the mills, two out of the seven plants found it advisable to operate their own testing laboratory. This required the services of a trained chemist. In the laboratory, tests were carried out to measure the oil content of the soybean, the volatility of the oil, the water content of the meal and oil and the protein content of the meal. This undoubtedly gave the processor a very complete analysis of the raw material he bought and of the products he produced.

Although soybean oil meal and soybean oil were the two main products produced by the Kansas mills, two of the seven mills were engaged in the feed mixing operation. No attempt was made to determine the relative success of each plant in the field of processing but it appeared that the feed mixing operation proved to be compatible with the general operations of the soybean processing plant. Two soybean mills in Kansas prepared mixed feeds.

#### Location of Kansas Soybean Processing Mills

All seven of the soybean mills in Kansas are located in the eastern one third of the state, which is the soybean producing area. With one exception, they are also situated in close proximity to the heavy soybean producing Corn Belt states. This location, it would appear, has assured the processor of an ample supply of beans.

Generally speaking, the type, size and location of the mill has resolved around the amount of soybean available and the accessibility of the consuming markets for the products. The latter factor is determined in many, if not most cases, by freight rates and the applicability of milling-in-transit privileges. Under the present regulations milling-in-transit privileges are applicable only to soybean meal while the soybean oil has continued to move on a flat rate.

All railway freight rates on carlot shipments of soybeans have been set up basis Decatur, Illinois, and as a result this had set the pattern and direction of shipments of the soybean oil meal processed in Kansas. Consequently, soybean oil meal which had been processed from

soybeans shipped in from the heavy producing Corn Belt region was destined for the areas to the south and to the west of Kansas. In the opinion of a few of the Kansas processors, railway routes and rates for the movement of soybean products, as yet, have not been well established.

Since the soybean processing plants were found to be located in the heart of the soybean producing area, it was interesting to note that only one of the seven mills depended to any considerable degree on locally produced beans. It was found that in order to maintain the mills in operation throughout the year, all the mills had to resort to shipments in of out-of-state soybeans. Shipments in were made from Missouri, Oklahoma, Iowa, Nebraska and from as far north as Minnesota. It suggested to the author, that expanded soybean storage facilities within the state of Kansas would return the farmer a greater amount per bushel of soybeans produced. Under such conditions of expanded soybean storage facilities the freight charges would be materially reduced.

The storage facilities that existed at the respective plants varied greatly as shown in Table 8. The storage facilities at the plants varied from the smallest which was a fourteen day supply of soybeans to the largest, which was a one hundred and eighty day supply of soybeans at their respective processing capacities.

It was the opinion of the processors that the construction of adequate storage facilities to provide for a full year's supply of soybeans would result in an enormous, unjustifiable, initial outlay for building. In addition the costs that would be incurred in the financing of the purchase of the soybeans would also bring undue hardship onto the processor. It was of course presupposed that the processor

would be buying his supply of soybeans during October and November when the soybean prices experienced their seasonal low.

#### The Hedging Operations of Kansas Soybean Processors

Inasmuch as there exists in the United States a number of Commodity Exchange providing hedging facilities which have been vitally essential to the processors of many commodities, an attempt was made to learn of the extent to which these facilities were being employed by the Kansas soybean processors.

All the processors were well aware of such existing facilities. However, their opinions regarding the degree of success with which a soybean processor would meet, varied. In some cases the skepticism shown in the success which would result in a soybean hedge was well founded, for on numerous occasions in the past, near disastrous losses had been experienced by a few of the processors.<sup>1</sup>

Whenever and wherever possible the processors preferred to hedge their positions by the use of forward contract sales of the soybean oil meal produced, and only when such contracts were not available, did the processors revert to the hedging facilities provided by the commodity exchanges.

Unlike soybean oil meal, the crude soybean oil was exclusively sold through brokers and jobbers for further shipment to the oil refineries.

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<sup>1</sup> Identity of these processors is concealed in compliance with their expressed wishes.

## CONCLUSIONS

Soybeans in Kansas have been contributing to, and accounting for, a larger proportion of the agricultural income with each succeeding year. Though Kansas' most important crop is wheat, the farmers in the eastern section of the state are extremely interested in what the soybean holds in store for them. In the high soybean producing counties of the state it was learned that the soybeans were competing with corn for the land, although for the state of Kansas as a whole, statistical evidence did not reveal such a condition. However, for the United States as a whole the presence of such competition between the two crops was statistically proven.

The prices of soybeans in the United States and in Kansas were found to swing through a wide seasonal cycle nearly every year. The contraction of this wide seasonal fluctuation would be facilitated if the farmers chose to sell their crop of soybeans more evenly throughout the year. This undoubtedly would require more storage facilities.

Increased participation in the soybean "futures" market, by speculators who would be willing to carry the risk of a price change, rather than to expect the processor of the soybeans or the user of the soybean products to carry the risk, would likely decrease the range of seasonal fluctuation of soybean prices.

Although both a more uniform rate of soybean sales by farmers and a government loan program could be expected to reduce seasonal price fluctuation, it is unlikely that the variation would be entirely eliminated. Soybean prices are influenced by price fluctuations of competing

products, and as long as these fluctuations are present, it can be expected that seasonal fluctuation of soybean prices, of some degree, will be exhibited.

The seasonal fluctuations of soybean meal and soybean oil prices in the United States did not go through as wide a swing as did the soybean prices. However, a definite seasonal pattern was evident.

The relationship between the prices received by farmers for soybeans in Kansas and the United States was very close, indicating that a one price market served the various soybean producing states in the United States.

Cottonseed oil, an almost perfect substitute for soybean oil, was found to be closely related, pricewise, to the soybean oil prices. It was also found, from a review of literature, that cottonseed oil prices were highly correlated to lard prices.<sup>1</sup> As a result, the general policy of livestock programs bears close relationship to the well being of the soybean industry. A study of the economic justification of producing a heavy type hog and the effect of such a practice on the soybean industry would indeed be interesting.

The very young soybean processing industry in Kansas was found to be suffering from growing pains. The intricate buying and selling operations carried out by the processors, in an effort to keep their plants in operation at a profitable margin of conversion, have been plagued by inadequate marketing channels, and government controls. The

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<sup>1</sup>Paarlberg. op. cit. p. 44

problem of the ever changing railway freight rates, complicated as they are, has provided further anxiety in the processing business. Another problem, which is common to all agricultural processing industries, and which as yet has not been resolved, is whether the industry should become centralized in a relatively few large plants or whether it should develop as a large number of small mills serving their local producing areas.

In conclusion it can be stated that the entire field of soybean production, marketing and processing is extremely complex. It is a fertile field for research and suggestive of many problems, the answer to which are well hidden.

#### ACKNOWLEDGMENTS

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**APPENDIX**

Table 9. Monthly average prices received by farmers for soybeans in the United States, 1925-1950.<sup>1</sup>

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1925	259	276	277	237	270	271	271	270	238	227	218	217
1926	238	233	239	227	267	271	220	220	231	197	185	183
1927	190	203	198	207	215	213	212	212	191	186	170	164
1928	120	169	185	193	205	206	205	205	189	172	169	170
1929	182	193	213	219	230	241	246	245	187	179	169	170
1930	185	191	200	207	211	216	196	190	180	164	148	144
1931	146	140	142	138	139	129	112	91	82	58	52	61
1932	62	59	65	65	64	61	58	58	57	55	45	44
1933	45	45	48	58	86	98	101	91	85	68	69	73
1934 <sup>b</sup>	81	101	116	126	125	145	154	125	105	95	89	111
1935	119	126	120	118	121	119	98	73	69	68	69	72
1936	76	77	73	78	83	85	105	119	110	107	112	130
1937	142	150	152	166	174	150	132	102	90	86	83	83
1938	88	93	89	85	87	86	85	75	71	64	63	67
1939	72	69	73	78	87	83	75	64	73	82	97	97
1940	103	96	101	100	96	79	73	67	69	67	84	81
1941	89	84	89	107	119	123	130	129	161	142	143	147
1942	165	178	119	176	173	163	162	158	157	158	158	159
1943	159	160	165	167	172	173	170	168	169	180	180	181
1944	182	185	189	191	193	193	191	190	193	204	205	205
1945	206	210	213	213	215	217	216	212	207	206	209	209
1946	209	211	212	212	216	217	231	235	228	239	275	275
1947	293	300	367	362	301	307	309	307	307	311	311	369
1948	111	297	323	364	374	390	366	291	291	227	236	236
1949	227	205	212	208	218	210	227	260	214	209	195	209
1950	211	212	225	248	280	293	271	271	242	203	254	270

<sup>1</sup> Prices in cents per bushel.

Sources: U. S. Department of Agriculture, Crops and Markets, December 1924 to January 1951. Washington: Government Printing Office.

Table 10. Twenty-four-month centered total of prices received by farmers for soybeans in the United States, 1925-1950.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1925	5695	5675	5631	5571	5501	6055	6003	5935	5848	5754	5707	5701
1926	5704	4997	4854	4807	4781	5122	5314	5273	5212	5170	5151	5135
1927	4915	4526	4519	4512	4704	4702	4648	4601	4574	4551	4531	4535
1928	4834	4864	4876	4881	4889	4489	4510	4546	4598	4652	4702	4754
1929	4830	4710	4635	4603	4581	4883	4899	4900	4885	4860	4829	4785
1930	4628	3948	3254	3050	2818	4493	4494	4335	4226	4099	3956	3799
1931	1618	1528	1467	1439	1129	1405	1371	1340	1308	1283	1193	11740
1932	1440	1522	1586	1627	1664	1717	1782	1874	1998	2134	2241	2327
1933	2424	2505	2556	2603	2650	2708	2784	2847	2876	2872	2860	2830
1934	2748	2640	2552	2649	2612	2383	2301	2209	2118	2036	1958	1886
1935	1859	1912	1999	2079	2161	2262	2386	2525	2672	2834	3013	3169
1936	3261	3271	3234	3193	3113	3067	3066	3855	2725	2521	2423	2272
1937	2161	2087	2041	1958	1972	1773	1822	1883	1941	1810	1787	1777
1938	1764	1713	1731	1715	1715	2062	2043	2018	1992	1963	1946	2077
1939	2076	2077	2076	2066	2062	2735	2860	3002	3172	3356	3515	3963
1940	2161	2280	2234	2601	2601	3890	3902	3922	3960	3942	3910	3887
1941	3864	3865	3890	3902	3922	3978	4022	4066	4111	4238	4256	4301
1942	3901	3922	3941	3942	4022	4521	4570	4618	4666	4715	4761	4854
1943	4383	4126	4172	4521	4521	5048	5054	5062	5069	5073	5073	5076
1944	4996	5032	5129	5158	5186	5308	5474	5621	5797	6011	6311	6577
1945	5091	5129	7070	7234	7409	7526	7654	7866	7981	7934	7892	7967
1946	6920	8263	8228	8084	7893	7653	7336	7060	6857	6590	6278	5942
1947	8263	5453	5391	5342	5283	5215	5172	5163	5133	5236	5329	5452
1948	1949	5623	5630	5636	5689							
1949	5638											
1950												

Source: Computed from data supplied by Crops and Markets.

Table 11. Centered twelve-month moving average of prices received by farmers for soybeans in the United States, 1925-1950.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1925												
1926	237.67	237.29	236.46	234.75	232.12	229.33	225.92	222.67	217.29	213.67	210.75	208.75
1927	208.21	204.79	202.25	200.29	199.21	197.67	195.92	193.67	191.71	190.58	189.62	188.96
1928	188.58	188.29	188.00	187.33	186.71	187.01	187.92	189.42	191.58	193.83	195.92	198.66
1929	202.67	203.17	203.17	203.88	203.88	204.12	204.17	204.54	201.21	199.38	197.38	196.38
1930	196.25	193.12	191.79	190.88	189.33	187.21	184.38	180.62	176.08	170.79	164.92	158.29
1931	151.17	143.67	135.58	127.08	118.67	111.21	104.25	97.38	90.83	81.62	78.16	72.50
1932	63.67	61.12	59.96	59.51	58.51	57.12	55.83	51.50	51.46	51.08	56.54	
1933	60.00	63.42	66.08	68.79	69.33	71.51	74.25	78.08	83.25	88.92	93.38	96.96
1934	101.00	104.38	106.50	108.42	110.42	112.83	116.00	118.62	119.83	119.67	119.17	117.92
1935	111.50	110.00	106.33	101.71	101.75	99.29	95.88	92.04	88.25	81.83	81.53	78.58
1936	77.46	79.67	83.29	86.62	90.04	94.25	99.42	105.21	111.33	118.08	125.51	132.04
1937	135.83	136.29	131.75	133.04	130.96	127.97	123.56	118.96	113.54	107.96	100.96	94.67
1938	90.04	86.96	85.95	83.33	81.58	82.17	78.75	77.08	75.42	74.46	74.17	74.04
1939	73.50	72.62	72.25	72.71	73.88	75.92	78.46	80.88	83.17	85.25	86.51	
1940	86.50	86.54	86.50	86.08	85.92	85.33	84.08	83.00	82.00	81.79	83.04	85.83
1941	90.04	95.00	101.42	108.38	113.96	119.17	125.08	132.17	139.83	146.46	151.58	155.50
1942	159.50	161.01	162.88	162.58	163.80	165.00	165.25	164.25	162.92	161.96	161.58	161.92
1943	162.67	163.42	161.33	165.76	167.58	169.42	171.29	173.29	175.33	177.33	179.21	180.92
1944	182.62	184.42	187.33	188.38	190.42	192.42	194.42	196.46	198.50	200.42	202.25	204.17
1945	206.21	208.17	209.67	210.33	210.58	210.92	211.21	211.38	211.38	211.38	211.38	
1946	212.12	213.71	214.92	216.08	221.17	228.08	234.33	241.54	251.71	264.33	274.04	281.33
1947	283.33	294.58	301.42	308.71	313.58	318.92	327.75	332.54	330.58	328.83	331.96	333.46
1948	314.29	316.00	312.83	336.83	328.88	318.88	305.67	294.17	285.71	274.58	261.58	247.58
1949	234.29	227.21	224.62	222.58	220.12	217.29	215.50	215.12	215.96	218.17	220.04	227.17
1950	232.83	234.83	231.58	231.83	237.04							

1 Prices in cents per bushel.

Source: Computed from data supplied by Crops and Markets.

Table 12. Percent of twelve-month centered moving average of prices received by farmers for soybeans in the United States, 1925-1950.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1925	98.3	101.3	96.2	102.2	116.6	107.5	96.0	96.4	93.0	90.8	91.2	91.2
1926	100.0	99.0	98.0	103.5	108.0	111.1	109.2	103.6	103.2	90.8	86.0	87.6
1927	91.3	99.0	99.0	103.5	110.2	113.9	109.2	106.2	99.5	97.4	89.5	85.2
1928	89.9	95.1	101.9	107.9	112.7	118.1	112.8	106.3	105.1	98.4	85.2	85.9
1929	93.0	95.1	101.4	108.4	111.6	115.5	106.5	105.0	102.3	88.6	85.6	86.9
1930	91.4	99.0	101.2	108.4	108.4	111.6	115.5	105.5	105.0	102.3	95.9	89.7
1931	96.7	97.2	101.4	103.7	116.8	116.2	107.7	96.9	90.1	68.2	66.7	91.1
1932	92.5	92.2	108.2	108.3	106.7	103.4	101.8	103.6	103.6	103.8	93.3	81.7
1933	75.0	71.4	72.7	83.1	121.6	136.1	140.5	120.5	102.4	76.4	74.2	75.3
1934	80.2	97.1	109.4	116.7	113.6	128.3	132.8	105.9	87.5	79.2	74.8	94.1
1935	101.4	111.5	113.2	113.5	118.6	120.2	102.1	79.3	98.4	80.0	84.1	91.1
1936	98.7	96.2	91.0	89.7	92.2	90.4	106.1	113.3	99.1	90.7	88.9	98.5
1937	101.4	110.3	113.6	124.8	132.8	117.2	106.5	85.7	78.9	82.2	87.4	87.4
1938	97.8	105.9	101.7	102.4	106.1	104.9	107.6	97.4	91.7	86.5	85.1	90.5
1939	97.3	94.5	101.4	106.8	118.6	109.2	96.2	79.0	88.0	85.9	91.3	111.5
1940	119.8	110.3	117.4	116.3	111.6	92.9	86.9	80.7	81.1	81.7	107.2	94.2
1941	98.9	88.4	88.1	99.1	101.4	103.4	104.0	104.0	97.7	115.0	94.1	94.2
1942	103.8	110.6	110.5	108.0	105.0	98.3	98.2	96.3	96.3	97.5	97.5	98.1
1943	97.5	98.2	100.6	100.6	102.4	102.4	99.4	97.1	96.6	101.7	100.6	100.0
1944	29.5	100.5	101.1	101.6	100.5	98.5	98.5	96.9	97.5	102.0	101.5	100.5
1945	100.0	101.0	101.4	101.4	101.9	102.8	102.4	100.5	98.1	97.6	99.0	98.6
1946	98.6	98.6	98.6	99.1	98.7	95.2	98.7	97.1	81.5	86.4	112.8	97.9
1947	103.5	101.7	121.9	117.2	95.5	96.2	94.2	92.2	92.1	94.5	102.3	109.2
1948	85.8	119.4	95.3	91.2	108.0	113.7	122.3	119.6	99.0	85.7	82.6	95.2
1949	97.0	90.3	94.2	93.3	99.1	96.3	105.1	120.9	99.1	95.9	92.1	92.1
1950	90.6	90.2	95.7	105.5	11h.3	115.7						

Source: Computed from data supplied by Crops and Markets.

Table 13. Monthly average prices received by farmers for soybeans in Kansas, 1925-1950.<sup>1</sup>

Year :	Jan. :	Feb. :	Mar. :	Apr. :	May :	June :	July :	Aug. :	Sept. :	Oct. :	Nov. :	Dec. :
1925	240	250	240	210	230	230	230	230	230	240	230	230
1926	260	275	290	260	250	250	250	250	250	220	210	190
1927	230	220	210	230	205	205	215	210	225	250	160	165
1928	185	195	195	200	200	230	220	210	200	200	175	200
1929	190	165	185	205	235	250	275	250	225	200	185	200
1930	185	195	205	175	180	155	145	125	110	175	150	145
1931	150	175	150	50	55	60	70	80	75	60	55	46
1932	146	50	60	65	90	105	130	130	125	100	75	75
1933	55	60	65	65	125	145	170	165	155	135	120	120
1934	80	105	120	120	120	150	150	150	125	120	105	105
1935	120	120	100	100	100	125	150	160	160	155	150	160
1936	100	160	160	160	160	160	160	150	125	110	80	80
1937	160	95	95	95	120	120	120	110	110	85	85	85
1938	85	95	95	105	115	120	120	110	120	70	80	100
1939	85	85	95	105	115	125	125	125	125	80	62	80
1940	105	105	115	115	105	120	120	130	135	135	130	140
1941	85	20	20	175	185	190	190	190	175	155	155	155
1942	150	170	170	170	170	165	163	164	165	180	180	180
1943	160	160	185	185	190	195	185	185	195	200	205	205
1944	180	210	210	215	215	215	220	220	210	195	205	210
1945	205	210	210	210	215	215	220	220	220	225	205	270
1946	210	210	295	335	305	280	265	275	275	305	335	350
1947	285	300	310	355	365	380	370	380	370	255	250	235
1948	400	200	205	202	208	202	218	210	215	205	195	205
1949	225	202	214	237	252	260	265	265	240	217	258	250
1950	203	202	202	214	237	252	260	265	265	217	195	258

L Prices in cents per bushel

Source: Kansas State Board of Agriculture. Report of the Kansas State Board of Agriculture. Topeka: State Printer, 1921 to 1950.

Table 1b. Twenty-four month centered total of prices received by farmers for soybeans in Kansas, 1925-1950.

Year :	Jan. :	Feb. :	Mar. :	Apr. :	May :	June :	July :	Aug. :	Sept. :	Oct. :	Nov. :	Dec. :
1925	5990	6000	5980	5940	5880	5645	5715	5790	5855	5900	5930	5930
1926	5960	5265	5045	5270	5250	5175	5780	5560	5425	5330	5330	5330
1927	5320	4795	4755	4680	4645	4695	5130	5065	4995	4960	4925	4850
1928	4805	4745	4780	4810	4820	4810	4740	4730	4760	4620	4685	4710
1929	4745	5230	5245	5230	5195	5125	5035	4850	4870	4920	4975	5060
1930	4155	3950	3760	3595	3125	3231	3028	2799	2579	2369	2144	1980
1931	1814	1679	1564	1474	1419	1413	1431	1450	1470	1510	1575	1660
1932	1765	1885	2015	2120	2195	2250	2295	2365	2465	2555	2630	2710
1933	2785	2850	2910	2975	3055	3145	3230	3285	3300	3325	3355	3310
1934	3305	3260	3195	3125	3075	3045	3010	2970	2930	2860	2785	2760
1935	2770	2815	2865	2970	3065	3165	3280	3100	3520	3640	3735	3730
1936	3780	3735	3655	3550	3490	3400	3250	3095	2955	2825	2695	2510
1937	2410	2395	2380	2385	2395	2405	2410	2400	2390	2400	2405	2400
1938	2400	2400	2400	2410	2405	2385	2395	2430	2470	2510	2540	2560
1939	2605	2585	2605	2580	2532	2524	2504	2664	2629	2389	2354	2375
1940	1941	2329	2311	2429	2577	2700	2810	2935	3080	3245	3410	3560
1941	1942	3830	3945	4020	4160	4105	4145	4170	4155	4135	4100	4055
1942	1943	4003	3950	3914	3929	3979	4029	4067	4119	4159	4224	4274
1943	4326	4369	4420	4470	4515	4565	4615	4685	4715	4765	4815	4860
1944	4915	4975	5010	5015	5010	5015	5015	5020	5030	5030	5025	5025
1945	5020	5020	5015	5000	5210	5370	5505	5665	5875	6135	6360	6520
1946	6635	6735	6855	7000	7110	7220	7415	7535	7515	7500	7570	7730
1947	7935	8045	8030	7930	7765	7565	7275	7000	6795	6537	6227	5897
1948	5562	5470	5290	5230	5155	5070	5018	5009	5053	5132	5132	5132
1949	5339	5386	5386	5386	5533	5425	5380	5380	5380	5380	5380	5380

Source: Computed from data supplied by the Reports of the Kansas State Board of Agriculture.

Table 15. Centered twelve-month moving average of prices received by farmers for soybeans in Kansas,  
1925-1950.<sup>1</sup>

Year :	Jan. :	Feb. :	Mar. :	Apr. :	May :	June :	July :	Aug. :	Sept. :	Oct. :	Nov. :	Dec.
1925	248.36	249.63	250.03	249.23	247.55	245.03	235.21	213.35	211.36	214.01	215.86	217.11
1926	221.71	219.43	218.32	219.67	218.52	215.64	213.83	211.08	208.13	206.74	226.08	222.18
1927	199.82	198.13	195.06	193.56	195.65	197.51	197.14	198.34	195.13	195.28	196.35	205.27
1928	202.13	199.25	200.40	200.81	201.73	202.13	201.88	202.92	205.00	207.29	210.83	211.79
1929	199.77	199.25	201.72	213.54	216.16	209.79	216.04	203.75	200.62	195.83	190.41	182.50
1930	217.92	218.51	217.92	142.71	134.63	126.17	134.63	126.17	107.46	98.71	89.33	81.63
1931	173.12	166.59	156.67	149.80	142.71	134.63	134.63	126.17	107.46	98.71	89.33	81.63
1932	75.58	69.96	65.17	61.42	59.13	58.88	59.63	60.42	61.25	63.92	65.63	62.17
1933	73.54	70.54	69.96	68.33	91.46	93.75	95.63	98.54	102.71	106.46	109.58	112.92
1934	116.04	118.75	121.25	123.96	127.29	131.04	131.58	136.88	137.50	138.50	139.79	139.16
1935	137.71	133.83	133.13	130.21	128.13	126.88	125.42	123.75	125.08	119.17	116.04	115.00
1936	115.42	117.29	120.21	123.75	127.71	131.88	136.67	111.67	114.67	151.67	155.63	157.50
1937	157.50	155.63	152.24	147.50	151.67	135.42	120.96	120.96	112.13	117.71	112.29	107.92
1938	101.67	99.79	98.17	99.38	99.79	100.81	100.42	100.00	99.58	100.00	100.21	100.00
1939	100.00	100.42	100.21	99.38	99.79	101.25	102.92	101.21	105.58	105.83	106.67	107.29
1940	107.71	108.54	107.50	105.50	105.17	104.33	102.67	101.21	99.51	98.08	97.46	97.04
1941	97.04	97.67	101.21	107.38	112.50	117.08	122.29	128.33	135.21	142.08	148.33	151.17
1942	159.58	161.38	167.50	169.17	171.04	172.71	173.75	173.12	172.29	170.83	168.96	170.08
1943	166.79	160.58	163.08	163.71	165.79	167.88	169.46	171.62	173.29	174.54	176.00	176.08
1944	180.25	182.04	181.17	186.25	188.12	190.21	192.29	191.38	196.16	198.51	200.62	202.50
1945	201.79	207.29	208.75	208.56	208.75	208.96	208.96	209.58	209.53	209.58	209.38	209.38
1946	209.27	209.58	210.21	211.67	217.08	223.75	229.38	236.04	244.79	255.62	265.00	271.67
1947	276.46	280.62	285.62	291.67	296.25	300.83	309.96	313.96	313.12	312.50	315.42	322.09
1948	330.62	335.21	331.58	330.42	323.54	315.21	303.12	291.67	283.12	272.38	259.88	215.50
1949	231.75	221.92	220.42	217.92	211.25	209.08	208.25	208.72	210.54	213.83	218.08	218.08
1950	222.46	224.42	224.50	224.17	226.04	230.54	230.54	230.54	230.54	230.54	230.54	230.54

<sup>1</sup> Price in cents per bushel

Source:

Computed from data supplied by the Reports of the Kansas State Board of Agriculture.

Table 16. Percent of twelve-month centered moving average of prices received by farmers for soybeans in Kansas, 1925-1950.

Year : Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1925	101.7	110.2	116.0	110.4	105.1	89.8	97.8	107.8	95.3	98.4	93.1
1926	101.8	100.7	95.6	105.1	116.0	99.2	101.5	99.3	97.3	94.6	85.1
1927	90.2	92.1	98.1	102.6	105.9	102.2	106.6	106.6	108.1	120.9	81.6
1928	89.2	92.6	92.1	98.1	99.6	113.8	108.9	106.5	100.9	102.4	101.9
1929	95.1	82.8	92.3	92.3	108.8	116.8	118.2	97.6	101.1	87.7	93.0
1930	81.9	89.0	94.0	116.7	125.5	114.8	121.4	110.3	99.5	89.3	79.7
1931	86.7	166.1	95.5	116.7	125.5	114.8	115.1	106.8	102.8	101.0	61.8
1932	60.5	71.4	81.6	99.4	118.6	135.6	125.0	100.0	98.4	93.8	60.6
1933	74.3	75.9	77.1	102.3	115.4	138.3	135.4	126.3	121.4	94.3	68.2
1934	69.0	88.2	92.2	100.3	114.2	129.8	122.2	113.1	112.3	85.7	86.3
1935	87.0	88.2	90.2	115.4	117.2	118.0	120.0	100.8	98.4	84.0	90.5
1936	87.0	85.5	83.3	80.6	97.7	113.6	116.8	112.7	105.4	98.7	96.2
1937	101.3	102.6	105.3	108.1	112.7	118.5	116.3	101.6	93.2	71.4	76.2
1938	83.3	95.0	96.0	96.0	120.0	120.0	118.0	110.0	110.0	85.0	85.0
1939	85.0	85.0	105.0	116.2	120.0	120.0	106.8	114.3	66.0	74.8	93.5
1940	97.2	96.3	106.5	108.5	119.0	120.2	121.4	123.8	80.0	63.3	82.5
1941	67.6	91.8	89.1	98.1	107.1	109.6	106.6	105.5	114.8	95.1	90.9
1942	93.8	103.7	104.2	109.5	111.1	109.8	109.2	101.2	20.1	90.6	91.7
1943	95.8	97.0	104.3	103.7	102.4	98.2	96.1	95.3	95.1	102.9	102.3
1944	100.0	101.6	100.5	99.5	101.1	102.6	96.4	95.4	99.5	100.5	101.5
1945	100.0	101.1	100.5	100.5	102.9	102.9	105.3	100.0	97.6	92.9	100.5
1946	100.5	100.9	100.9	99.1	99.1	96.1	93.8	93.0	85.7	87.9	115.1
1947	103.3	105.0	111.7	118.2	103.0	93.0	85.5	87.6	87.9	106.3	108.7
1948	120.8	89.6	92.5	107.6	112.7	120.6	122.1	95.9	90.1	82.7	96.2
1949	97.0	87.7	93.2	92.7	96.7	95.7	101.3	115.4	102.9	97.2	91.1
1950	91.4	90.2	95.5	105.8	111.5	112.6					94.0

Source: Computed from data supplied by the Reports of the Kansas State Board of Agriculture

Table 17. Monthly average wholesale price of soybean meal in the United States, 1936-1951.<sup>1</sup>

Year :	Jan. :	Feb. :	Mar. :	Apr. :	May :	June :	July :	Aug. :	Sept. :	Oct. :	Nov. :	Dec. :
1936	24.50	23.35	21.85	21.80	21.75	21.50	21.50	22.70	22.90	23.00	23.00	22.95
1937	22.65	22.25	22.75	24.35	28.40	30.50	41.00	38.55	36.40	33.00	31.80	32.30
1938	30.50	32.30	32.30	31.30	31.65	35.55	36.30	42.10	41.00	40.20	39.85	43.90
1939	42.15	40.20	38.65	35.65	35.60	32.30	29.50	24.50	24.25	27.35	27.10	28.10
1940	28.20	26.25	24.60	24.60	27.55	27.60	10.85	16.90	11.30	18.10	11.35	11.00
1941	45.75	42.20	42.20	49.40	49.95	43.00	38.15	37.10	31.80	31.00	29.85	29.50
1942	30.25	31.10	28.25	27.25	27.30	27.00	28.60	27.20	28.00	27.10	26.50	28.10
1943	28.20	26.25	26.10	26.40	27.50	27.45	26.50	27.30	37.15	29.80	39.60	36.00
1944	33.30	30.45	30.60	30.20	29.50	25.25	23.80	25.25	27.50	27.70	32.20	30.55
1945	30.75	28.25	28.25	28.80	29.45	31.75	35.40	37.60	43.40	41.00	41.25	41.10
1946	18.00	18.60	15.70	15.70	10.45	10.45	39.80	42.80	43.35	45.35	46.15	48.70
1947	42.00	42.00	43.15	43.40	43.40	43.40	48.00	53.55	53.55	53.55	53.55	53.55
1948	53.55	53.55	53.55	53.55	53.55	53.55	53.55	53.55	53.55	53.55	53.60	53.80
1949	53.80	53.80	53.80	53.80	53.80	53.80	53.80	53.80	53.80	53.80	53.80	53.80
1950	53.80	53.80	53.80	53.80	61.30	67.80	100.10	91.20	67.15	78.60	89.85	78.65

<sup>1</sup> Price in dollars per ton, Chicago, 41 percent.

Source: U.S. Department of Agriculture. The Feed Situation. Washington: Government Printing Office. December 1935 to January 1951.

Table 18. Twenty-four month centered moving total of the wholesale prices of soybean meal in the United States 1936-1950.

Year	Jan.	Feb.	Mar.	Apr.	May	June
1936						
1937	593.40	629.15	658.90	682.40	701.20	719.35
1938	821.40	819.85	827.60	839.10	851.65	871.30
1939	928.40	944.00	869.65	840.05	814.45	785.90
1940	650.35	681.10	726.35	757.35	782.50	812.50
1941	1051.50	1042.90	1019.70	1000.10	981.50	955.90
1942	728.15	708.70	695.00	687.30	680.05	675.30
1943	652.70	650.70	659.95	671.80	683.60	700.80
1944	710.60	735.85	721.15	712.40	706.90	698.05
1945	700.10	724.85	752.30	781.50	803.85	826.45
1946	1022.20	1035.45	1043.25	1050.35	1062.95	1074.90
1947	1070.00	1085.30	1103.60	1119.20	1131.45	1141.25
1948	1279.65	1285.20	1285.20	1285.20	1285.25	1285.55
1949	1269.05	1289.35	1290.05	1290.55	1291.00	1291.20
1950	1386.50	1473.20	1526.94	1565.10	1625.95	1686.85

Sources: Computed from data supplied by The Feed Situation.

Table 18 (cont.). Twenty-four month centered moving total of the wholesale prices of soybean meal in the United States, 1936-1950.

Year	July	Aug.	Sept.	Oct.	Nov.	Dec.
1936	532.35	536.10	536.20	539.85	549.25	561.90
1937	730.55	754.45	774.05	793.55	809.75	821.05
1938	897.55	917.10	931.35	939.05	911.05	938.45
1939	756.15	726.25	700.15	671.95	656.15	613.70
1940	845.95	879.45	913.70	956.80	1001.00	1011.80
1941	922.50	899.20	873.85	837.15	792.35	753.70
1942	671.85	664.65	657.35	651.35	653.70	651.35
1943	711.60	729.90	738.60	746.90	745.70	715.50
1944	690.05	685.30	680.75	677.00	675.55	682.00
1945	857.35	894.85	932.65	963.40	987.70	1006.75
1946	1,073.40	1,060.80	1,051.65	1,050.40	1,054.65	1,061.20
1947	1,157.75	1,180.85	1,202.80	1,223.35	1,243.65	1,263.95
1948	1,286.05	1,286.55	1,287.05	1,287.55	1,288.05	1,288.55
1949	1,291.20	1,291.20	1,291.20	1,291.20	1,301.70	1,326.20
1950						

Source: Computed from data supplied by The Feed Situation.

Table 19. Centered twelve-month moving average of the wholesale prices of soybean meal in the United States, 1936-1951.<sup>1</sup>

Year :	Jan. :	Feb. :	Mar. :	Apr. :	May :	June :	July :	Aug. :	Sept. :	Oct. :	Nov. :	Dec. :
1936							22.47	22.35	22.34	22.49	22.89	23.54
1937	24.73	26.21	27.45	28.43	29.22	29.97	30.69	31.44	32.25	33.06	33.74	32.84
1938	34.23	34.16	34.43	34.98	35.61	36.43	37.40	38.21	38.81	39.13	39.21	39.10
1939	38.68	37.67	36.24	35.00	33.94	32.75	31.51	30.34	29.17	28.12	27.34	26.82
1940	28.90	27.10	30.27	31.56	32.60	33.85	35.25	36.64	38.07	39.87	41.83	42.41
1941	43.94	43.42	42.49	41.67	40.90	39.81	38.56	37.47	36.41	34.88	33.01	31.40
1942	30.34	29.53	28.96	28.61	28.34	28.11	27.99	27.69	27.39	27.26	27.24	27.26
1943	27.20	27.11	27.50	27.99	26.48	28.19	29.73	30.61	30.78	31.12	31.07	31.06
1944	30.86	30.66	30.17	29.68	29.45	29.09	28.75	28.55	28.36	28.21	28.15	28.12
1945	29.17	30.17	31.35	32.56	33.49	31.44	35.72	37.29	38.86	40.14	41.15	41.95
1946	42.59	43.14	43.47	43.76	44.29	44.73	44.20	43.82	43.77	43.94	44.22	
1947	44.58	45.22	45.98	46.63	47.14	47.55	48.24	49.20	50.12	50.97	51.82	52.66
1948	53.32	53.55	53.73	53.55	53.55	53.56	53.59	53.61	53.65	53.67	53.67	53.69
1949	53.71	53.73	53.75	53.77	53.79	53.80	53.80	53.80	53.80	53.80	53.80	53.80
1950	57.77	61.38	63.62	65.21	67.75	70.29						

<sup>1</sup>Price in dollars per ton, Chicago, 41 percent.  
Source: Computed from data supplied by The Feed Situation.

Table 20. Percent of twelve-month centered moving average of the wholesale prices of soybean meal in the United States, 1936-1951.

Year :	Jan.	: Feb.	: Mar.	: Apr.	: May	: June	: July	: Aug.	: Sept.	: Oct.	: Nov.	: Dec.
1936	91.6	84.9	82.9	85.6	97.2	101.8	95.7	101.6	102.5	102.3	100.5	97.5
1937	89.1	94.6	93.7	98.1	97.3	97.6	133.6	123.9	112.9	99.8	94.2	98.4
1938	109.0	106.7	106.7	101.9	101.0	98.6	97.1	110.2	105.6	102.7	101.6	112.3
1939	109.1	106.7	106.7	80.9	77.0	81.5	93.6	80.8	83.1	97.3	99.1	101.8
1940	101.0	92.1	80.1	80.9	77.0	81.5	115.9	128.0	116.4	95.6	98.9	101.4
1941	101.1	97.2	100.7	118.6	122.1	108.5	98.9	99.0	87.3	88.9	90.4	93.9
1942	99.7	106.3	97.5	95.1	96.3	95.9	102.2	98.2	102.3	92.4	97.3	103.1
1943	103.7	96.8	94.9	94.3	96.6	94.0	89.1	89.8	120.7	95.8	114.6	115.9
1944	107.9	99.3	101.4	101.8	100.2	86.8	86.8	88.4	97.0	98.2	111.4	107.5
1945	105.4	93.6	90.1	68.5	87.9	92.2	99.1	100.8	111.7	102.1	100.2	105.1
1946	112.7	112.7	105.1	96.2	91.3	88.9	95.7	98.3	103.5	105.4	110.8	107.9
1947	94.2	92.9	92.9	93.1	98.1	91.3	99.5	108.8	106.8	105.1	103.3	101.7
1948	100.4	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.8	99.9	100.2	97.4
1949	100.2	100.1	100.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.2	97.4
1950	93.1	87.7	84.6	82.5	94.9	96.5						

Source: Computed from data supplied by The Feed Situation.

Table 21. Monthly average prices of soybean oil in the United States, 1936-1950.<sup>1</sup>

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1936	7.6	7.2	6.8	6.8	6.3	6.0	7.9	8.0	8.2	8.0	8.0	9.1
1937	9.8	9.9	9.8	9.0	8.2	7.5	6.8	6.2	5.6	5.6	5.6	5.2
1938	5.8	6.1	6.4	5.9	5.7	5.2	5.9	5.7	5.2	5.0	5.0	5.1
1939	5.0	4.7	4.9	4.7	4.9	4.9	4.3	4.2	5.1	4.9	4.8	5.1
1940	5.3	5.4	5.7	5.5	5.3	4.7	4.7	4.4	4.1	3.9	4.3	4.5
1941	5.1	5.1	6.0	7.6	8.7	9.6	9.8	9.5	10.5	10.4	9.8	10.1
1942	11.4	11.7	11.8	11.8	11.6	11.6	11.4	11.4	11.7	11.8	11.8	11.8
1943	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8
1944	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8
1945	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8
1946	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8
1947	26.0	28.4	33.6	27.4	21.4	16.2	17.2	15.9	18.8	20.7	25.6	26.2
1948	26.6	19.6	21.4	26.5	26.3	27.3	22.1	22.1	22.8	18.6	19.1	17.3
1949	14.3	12.3	10.8	10.5	10.8	9.4	9.7	12.9	11.4	10.1	9.6	10.2
1950	10.8	11.4	12.8	13.1	15.8	13.2	12.9	11.5	15.0	15.6	17.1	19.6

<sup>1</sup>Wholesale prices in cents per pound at Northwestern mills, F.O.B.

Source: U.S. Department of Agriculture. The Fats and Oils Situation. Washington: Government Printing Office. December 1936 to January 1951.

Table 22. Twenty-four month centered total of wholesale prices of soybean oil in the United States, 1936-1950.

Year :	Jan. :	Feb. :	Mar. :	Apr. :	May :	June :	July :	Aug. :	Sept. :	Oct. :	Nov. :	Dec. :
1937	2110	2094	2062	2020	1974	1911	1820	1869	1926	1996	2013	2092
1938	1420	1401	1380	1362	1318	1311	1332	1754	1682	1609	1537	1474
1939	1204	1173	1157	1155	1152	1150	1153	1310	1281	1254	1223	1223
1940	1210	1216	1208	1188	1173	1162	1151	1163	1163	1178	1194	1206
1941	1121	1153	1628	1757	1877	1988	1777	2007	2236	2360	2533	2584
1942	2618	2651	2682	2708	2742	2779	2800	2805	2806	2806	2806	2806
1943	2816	2826	2831	2832	2832	2832	2832	2832	2832	2832	2832	2832
1944	2832	2832	2832	2832	2832	2832	2832	2832	2832	2832	2832	2832
1945	2832	2832	2832	2832	2832	2832	2832	2832	2832	2832	2832	2832
1946	2032	2851	2870	2940	3131	3396	3656	3961	4318	4722	5134	5134
1947	5252	5328	5420	5509	5512	5591	5512	5512	5302	5151	5171	5311
1948	5451	5562	5664	5683	5597	5413	5231	5035	4856	4610	4315	3981
1949	3673	3462	3256	3057	2877	2711	2605	2561	2572	2618	2674	2712
1950	2812	2860	2912	2993	3113	3282						

Source: Computed from data supplied by The Fats and Oils Situation.

Table 23. Percent of twelve-month centered moving average of wholesale prices of soybean oil in the United States, 1936-1950.

Year :	Jan. :	Feb. :	Mar. :	Apr. :	May :	June :	July :	Aug. :	Sept. :	Oct. :	Nov. :	Dec. :
1936												
1937	111.4	113.8	114.0	116.7	109.8	102.5	103.9	102.6	102.5	96.4	94.1	104.6
1938	96.7	105.2	112.3	103.5	101.8	92.9	105.4	93.2	88.6	85.6	87.5	85.2
1939	100.0	95.9	102.1	97.9	103.1	102.1	89.6	87.5	103.6	93.1	95.2	93.0
1940	106.0	105.9	111.0	112.2	108.2	97.9	97.1	92.7	85.4	104.1	98.0	102.0
1941	87.4	81.0	89.2	104.1	111.5	115.7	111.4	102.2	107.1	101.0	92.5	93.5
1942	101.6	106.4	105.4	104.4	103.5	100.0	95.7	97.4	109.0	100.9	100.9	103.9
1943	103.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1944	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1945	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1946	99.2	98.3	95.9	95.9	90.1	83.7	77.6	83.0	65.2	95.4	116.9	115.0
1947	116.7	127.9	115.7	119.1	93.6	73.4	73.8	69.1	85.1	95.3	117.1	113.6
1948	117.2	84.5	90.7	103.4	112.9	122.3	101.4	105.2	112.9	95.4	106.1	104.2
1949	92.5	85.4	72.4	82.7	92.0	63.2	89.0	120.6	105.5	92.6	86.5	89.5
1950	92.3	95.8	105.8	104.8	105.2	95.4						

Source: Computed from data supplied by The Fats and Oils Situation.

Table 24. Centered twelve-month moving average of the wholesale price soybean oil in the United States, 1936-1950.<sup>1</sup>

Year :	Jan. :	Feb. :	Mar. :	Apr. :	May :	June :	July :	Aug. :	Sept. :	Oct. :	Nov. :	Dec.
1936	8.7	8.6	8.4	8.2	8.0	7.6	7.6	8.0	8.3	8.5	8.7	8.7
1937	8.3	8.7	5.8	5.7	5.6	5.6	7.6	7.3	7.0	6.7	6.4	6.1
1938	6.0	5.8	4.9	4.8	4.9	4.8	5.5	5.3	5.2	5.1	5.1	5.1
1939	5.0	4.9	5.1	5.0	5.0	4.8	4.8	4.9	5.0	5.0	5.0	5.0
1940	5.9	5.1	5.0	5.0	5.9	4.6	4.0	4.8	4.9	5.1	5.5	5.5
1941	5.9	5.3	6.0	7.0	7.0	8.0	8.0	9.3	9.8	10.3	10.6	10.8
1942	10.9	11.0	11.2	11.3	11.4	11.6	11.7	11.7	11.7	11.7	11.7	11.7
1943	11.7	11.8	11.8	11.0	11.0	11.0	11.8	11.8	11.8	11.8	11.8	11.8
1944	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8
1945	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3
1946	11.3	11.9	12.0	12.3	12.3	12.3	12.4	12.5	12.5	12.5	12.5	12.5
1947	21.9	22.2	22.5	23.0	23.1	23.2	23.3	23.0	22.1	21.5	21.5	22.1
1948	22.7	23.2	23.6	23.7	23.3	22.7	21.0	21.0	20.2	19.2	18.0	16.6
1949	15.3	14.4	13.6	12.7	12.0	11.3	10.9	10.7	10.9	10.9	11.1	11.4
1950	11.7	11.9	12.1	12.5	13.0	13.7						

<sup>1</sup>Wholesale price in cents per pound at Northwestern mills, F.O.B.

Source: Computed from data supplied by The Fats and Oils Situation.

A Replica of the Schedule used in Compiling the Information Offered by the Kansas Soybean Processors

General Information

1. Date of construction . . . . .
2. Daily processing capacity . . . . .
3. Type of process . . . . .
4. Storage facilities at plant . . . . .
5. Where does your supply of beans originate? . . . . .
  
6. Percentage of beans bought from farmers . . . . .
  - " " " " " elevators . . . . .
  - " " " " trucked in . . . . .
  - " " " " shipped in by rail . . . . .
  
7. Are purchasers of beans hedged? . . . . If not, why not? . . .
  
  
8. What method of insurance against losses do you employ? . . . .
  
  
9. What are the market outlets for the oil and the meal . . . . .

How are the shipments made?

Notes

A Replica of the Letters Sent to the County Agricultural Agents of the Leading Soybean Producing Counties in the State of Kansas.

November 7, 1952

Mr. Donal A. Brown,  
County Agricultural Agent,  
Ottawa, Kansas.

Dear Sir:

I am carrying out a study on the production and marketing of soybeans in Kansas. Eleven counties including Franklin county have been accounting for approximately 75% of the total annual soybean production in Kansas.

I would greatly appreciate any and all information which you may have regarding soybean production and marketing in Franklin county.

Basically, the information I am looking for is:

1. what crop or crops have soybeans displaced in your county, and in your opinion what is the most important factor or factors which most determines the number of acres of soybeans that are planted annually in Franklin county?
2. into what crop rotation if any, have soybeans entered?
3. what principal marketing channels are used by soybean producers in your county?

I am contacting the remaining ten county agents regarding similar information, and if time permits, would like to visit with you before I complete this study.

Sincerely,

W.J. Ewasiek  
Instructor

SOYBEANS IN KANSAS

by

WILLIAM JOSEPH EWASIUK.

B. S. University of Alberta, Alberta, Canada, 1951

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AN ABSTRACT OF A THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Economics and Sociology

KANSAS STATE COLLEGE  
OF AGRICULTURE AND APPLIED SCIENCE

1953

The importance of soybeans to American agriculture, and especially to Kansas agriculture is still not fully realized. Since the first introduction of soybeans into the United States in 1804, and into Kansas in 1889, soybean production has been increasing continually. If past history is used as a basis to predict what the future trend in soybean production will be, then only a continued increase of soybean production is in sight. Of course, limits to expansion exist and the factors limiting further expansion of soybean production are beginning to take force.

The center of soybean production in the United States has been the Corn Belt, which produced approximately 90 percent of the total. The eastern one third of Kansas, which fringes the Corn Belt produced approximately 2.5 percent of the total. Although such a contribution to the total appeared highly insignificant, the significance to part of Kansas manifested itself once it was learned that eleven counties produced 75 percent of Kansas' total production of approximately 6.5 million bushels.

With the concentration of soybean production in a relatively small area in the United States, it was found that a high degree of competition for the use of land resources existed between corn and soybeans. A similar condition of high competition for land resources between corn and soybeans was not evident in Kansas; however, it was learned from the county agricultural extension agents of eastern Kansas that soybeans had displaced corn and various other grains such as oats, sorghums and wheat.

The general trend of soybean prices received by Kansas farmers has

followed closely the level of economic activity. In the 1920's the price was high, then declined from 1929 to 1931. From 1933 to 1936 there was a price recovery and then in 1937 when the national economy suffered a recession the price dropped again. With the outbreak of World War II the price of soybeans suddenly became higher and has remained at that high level.

The soybean market, which is a one price market, serves with equal diligence both the Kansas farmers and the farmers of the United States. A high degree of correlation existed between the average monthly prices received by farmers for soybeans in the United States and in Kansas.

The soybean, which itself is of little value other than as seed, yields two joint products, soybean meal and soybean oil. These two joint products have determined the value of the soybean. Soybean meal and soybean oil once produced enter a highly competitive market. Linseed meal, cottonseed meal, fish meal, peanut meal are all competitors of soybean meal, while cottonseed oil, linseed oil, lard, butter and tallow are competitors of soybean oil. Under such conditions it was found that there was a high degree of correlation between price movements of soybean oil and cottonseed oil.

In an effort to examine the month to month movement of soybean prices and possibly to facilitate the prediction of the prices of soybeans, soybean meal and soybean oil a seasonal index was constructed. As a measure of conformity to this seasonal price movement, use was made of an index of irregularity. This index of irregularity was the average deviation of the percentages of trend about the value of the

index of average seasonal variation for that month.

For the period of 1925 to 1950, the seasonal movement of prices received by farmers for soybeans in the United States and in Kansas was characterized by a somewhat violent fluctuation. The index of seasonal variation of soybean prices in the United States reached a low of 90.3 in October, then rose to a high of 109.5 in June and subsequently declined regularly to the October low. The index of irregularity was 7.4 and included 62 percent of the prices.

During that same period the seasonal movement of soybean prices received by Kansas farmers exhibited a similar violent fluctuation. The low of 88.0 occurred in November and the high of 113.0 occurred in June. The index of irregularity was a high of 8.4.

Since the end of World War II the seasonal movement of soybean prices in the United States and in Kansas, has not exhibited as violent a fluctuation as it did for the period from 1925 to 1950. The range of fluctuation in the United States decreased from 19.3 to 13.9 and in Kansas it decreased from 25.0 to 13.0. The seasonal index for the period since the end of Warld War II took in only six years, as a result a limitation on its reliability is immediately evident.

The problem confronting the soybean grower, in the face of such wide seasonal price fluctuation, is whether to sell during harvest time or store for future sales. Mr. Rollefson of the United States Department of Agriculture proved, that 3 of the 4 post-war years, those farmers who stored soybeans at harvest for sale later in the season were well paid. Of the farmers who stored 1500 bushels in each crop year from 1946-1947 through 1949-1950, those who sold the soybeans at the average

December-January price earned for the four years, \$1800 more than they would have received at harvest time; those who sold at the average March-April-May-June price received \$200 extra; and those who anticipated market changes well enough to sell within 25 cents a bushel of the seasonal peak price received at least \$3000 extra. With such net gains possible through storage, the common practice of growing soybeans as a cash crop, to tide over the farmer between the wheat and corn harvest, appears to have little merit.

The seasonal price movement of soybean oil and soybean meal did not reflect the violent seasonal fluctuations of soybean prices. A definite seasonal price pattern for the two products was not found; however, when a comparison of the two indicia was made an almost perfect inverse relationship existed. A seasonal price decline of one of the products tended to be offset by price increase of the other product.

Oil seed processing in Kansas got its start in 1890 but it was not until 1940 that a soybean processing industry in Kansas began to assert itself. Today seven soybean mills, with a total capacity of approximately 20,000 bushels per day, are located in Kansas. The soybean processing industry is still in its infancy. Grave problems face the industry, the inability to successfully hedge their raw materials, the lack of storage facilities and government price controls appeared to be of prime concern. Another problem which faces the industry which is tied in with the railway freight rate structure, is the future location of additional plant capacity. Should the plants be located near the soybean producing area or near the soybean product consuming area? A problem which is common to all agricultural processing industries and

which as yet has not been resolved, is whether the industry should be centralized in the relatively few large plants or whether it should develop as a large number of small mills serving these local producing areas.

In conclusion it can be stated that the entire field of soybean production, marketing and processing is extremely complex, and as yet no equilibrium has been reached. It is a fertile field for research and suggestive of many problems, the answers to which are well hidden.